



NO. 1, PERSIARAN DATO' MENTERI, SECTION 2,
40700 SHAH ALAM, SELANGOR DARUL EHSAN
MALAYSIA
Tel.: 603-55446479
Fax: 603-55446787
www.sirim-sqas.com.my

Validation Report

Project Title

**Methane Recovery and
Utilization at Prosper
Palm Oil Mill, Malaysia**

Report No.: SQAS-CDM-EG03530001

Date : 26 December 2012

Date of first issue: 23 March 2012	Project No.: SQAS-CDM-EG03530001
Approved by: Parama Iswara Subramaniam	Project title : Methane Recovery and Utilization at Prosper Palm Oil Mill, Malaysia
Client: Green Lagoon Technology Sdn Bhd	Designated Operational Entity: SIRIM QAS International Sdn Bhd

Summary:

SIRIM QAS International Sdn Bhd has performed a validation of the "Methane Recovery and Utilization at Prosper Palm Oil Mill, Malaysia" project, based on the Kyoto Protocol requirements, UNFCCC rules and associated interpretations. The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

The validation consisted of three phases; i) a document review of the project design documents and preparation of validation protocol, ii) on-site visit to the project activity and interviews with project developer and project consultant, and, iii) resolution of outstanding issues and the issuance of final validation report and opinion.

The project is aiming to reduce GHG emissions by capturing and utilizing the methane that would have been emitted to the environment from the series of open lagoon treatment system by combusting the methane in the gas engine for electricity generation and in the boiler for heat generation. Any excess of biogas will be destroyed in an enclosed flare.

The overall validation process, from contract review to the validation report and opinion was conducted using SIRIM QAS Intl.'s internal procedures. The first output of the validation process was a list of corrective action request, clarification request and forward action request (CAR, CL and FAR), presented in Table 3 of Appendix A of this report.

In summary, it is SIRIM QAS Intl.'s opinion that the proposed CDM project activity correctly applies the baseline and monitoring methodology applied for the project activity and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria.

Report No.: SQAS-CDM-EG03530001			Indexing terms	
Report title: Methane Recovery and Utilization at Prosper Palm Oil Mill, Malaysia			Climate Change, Kyoto Protocol Small Scale Project Validation Clean Development Mechanism	
Work carried out by: Syed Anuar Shah Syed : Validation Team Leader Mansor Aernida Abdul Kadir : Validation Team Member Work reviewed by : Dr. B.G.Yeoh			<input checked="" type="checkbox"/> No distribution without permission from the Client or responsible organization unit <input type="checkbox"/> Limited distribution <input type="checkbox"/> Unrestricted distribution	
Work verified by: Parama Iswara Subramaniam				
Date of this revision :	Rev.:	Number of pages:		
26 December 2012	02	26		

Abbreviations

AMS	Approved Methodology Small Scale
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reductions
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon Dioxide
CO _{2e}	Carbon Dioxide Equivalent
DOE	Designated Operational Entity
DNA	Designated National Authority
EB	Executive Board
FFB	Fresh Fruit Bunches
GHG	Greenhouse gas(es)
GSCP	Global Stakeholders Consultation Process
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
LoA	Letter of Approval
MoC	Modalities of Communication
MoV	Means of Verification
MP	Monitoring Plan
ODA	Official Development Assistance
POME	Palm Oil Mill Effluent
PDD	Project Design Document
QA/QC	Quality Assurance/Quality Control
SIRIM QAS Intl.	SIRIM QAS International Sdn Bhd
UNFCCC	United Nations Framework Convention on Climate Change

TABLE OF CONTENTS	PAGE
1.0 INTRODUCTION	4
1.1 Objective	4
1.2 Scope	4
1.3 Validation Team	4
1.4 Technical Reviewer	5
2.0 METHODOLOGY	5
2.1 Document Review of PDD and Other Documents	5
2.2 Follow-up Interviews	6
2.3 Resolution of Clarification and Corrective Action Requests	7
2.4 Internal Quality Control	7
3.0 VALIDATION FINDINGS	7
3.1 Participation requirements	7
3.2 Modalities of Communication	8
3.3 Project Design Document	8
3.4 Description of Project Activity	8
3.5 Baseline and Monitoring Methodology	9
3.5.1 Applicability of the Selected Methodology	9
3.5.2 Project Boundary	10
3.5.3 Baseline Identification	11
3.6 Additionality	11
3.6.1 Prior Consideration of the CDM	11
3.6.2 Investment Barrier	12
3.7 Monitoring Plan	14
3.7.1 Parameters Determined Ex-Ante	15
3.7.2 Parameters Determined Ex-Post	15
3.8 Calculation of GHG Emissions	17
3.8.1 Baseline Emissions	17
3.8.2 Project Emissions	19
3.8.3 Leakage Emissions	21
3.8.4 Emission Reductions	21
3.9 Environmental Impacts	21
3.10 Crediting Period	22
3.11 Comments by Local Stakeholders	22
4.0 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS	22
5.0 VALIDATION OPINION	23
6.0 REFERENCES	25
Appendix A: Validation Protocol	
Appendix B: GSCP Comments	
Appendix C: Auditor's competence certificate	

1.0 INTRODUCTION

Green Lagoon Technology Sdn Bhd. has engaged SIRIM QAS International Sdn. Bhd. to perform validation of the "Methane Recovery and Utilization at Prosper Palm Oil Mill, Malaysia" (hereafter called "the project activity").

This report summarized the findings of the validation of the project, performed on the basis of CDM VVM (version 1.2) and related UNFCCC criteria for CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to the Kyoto Protocol criteria, the CDM rules and modalities as agreed in the Bonn Agreement, the Marrakech Accords and the CDM Executive Board's decisions.

1.1 Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

1.2 Scope

The scope of the validation is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations.

SIRIM QAS Intl. has based on the recommendations in the Validation and Verification Manual (VVM) (version 1.2) employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the client. However, the stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 Validation Team

The following validation team has been assigned to carry out the validation of the project.

Name	Involvement						
	Validation team leader	Validation team member	Technical Expert	Others (to specify)	Desk review	On-site audit	Sectoral competence
Syed Anuar Shah Syed Mansor	√	√			√	√	√
Aernida Abdul Kadir		√			√	√	√

Syed Anuar Shah Syed Mansor is a Chemical Engineer by qualification. He has extensive experience in the area of renewable energy, energy efficiency and wastewater treatment

technology. He has been trained in the CDM validation and verification processes, and has been qualified as a CDM lead auditor in accordance with SIRIM QAS Intl.'s qualification criteria.

Aernida Abdul Kadir holds a Degree in Electrical-Electronics Engineering and a Diploma in Palm Oil Milling and Technology Management. She has several years of working experience in palm oil milling including the operation of POME treatment plant, biomass boilers and diesel generators. She has been trained in CDM validation and verification processes, and has been qualified as a CDM lead auditor in accordance with SIRIM QAS Intl.'s qualification criteria. She is also a qualified Environmental Management System (ISO 14001) lead auditor.

The qualification of each individual validation team member is detailed in Appendix C to this report.

1.4 Technical Reviewer : Dr B G Yeoh

He holds a D.Eng. degree in Environmental Engineering. He possesses extensive experience in the areas of environmental technology and energy technology, covering environmental pollution and waste management, bioenergy, sustainable renewable energy, cleaner production, and GHG emissions reduction. He has managed projects in the various stages of the CDM cycle from PDD development through validation, monitoring, verification and CER issuance, covering various sectors, including renewable energy, cogeneration, fuel switch, methane capture, manure management, etc.

2.0 METHODOLOGY

SIRIM QAS International's validation process consists of the following phases:

- i) a document review of the project design documents and preparation of validation protocol;
- ii) on-site visit to the project activity and interviews with project developer and project consultant; and
- iii) resolution of outstanding issues and the issuance of final validation report and opinion

In order to ensure transparency, a validation protocol was customized for the project according to the VVM (version 1.2). The protocol describes criteria (requirements), means of verification and the results from the validation of the identified criteria, in a transparent manner. The validation protocol serves the following purposes :

- it organizes, details and clarifies the requirements that a CDM project is expected to meet;
- it ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The completed validation protocol is enclosed in Appendix A of this report.

During the validation, non-fulfillment of the validation protocol criteria or identified risks to the fulfillment of project objectives were raised as either CAR or CL. Corrective Action Requests (CAR) were issued, where:

- i) mistakes had been made that directly impacted on the project results; or
- ii) CDM requirements had not been met; or
- iii) there was a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

The Clarification Requests (CL) were issued where additional information was needed to clarify issues, and Forward Action Requests (FAR) for issues relating to project implementation that required review during the first verification of the project activity.

2.1 Document Review of PDD and Other Documents

The PDD (version 1.0)^{/1/}, ER spreadsheet^{/6/} and financial analysis spreadsheet^{/7/} were submitted by the project participant and additional backgrounds documents related to the project design and

baseline were reviewed as an initial step of the validation process. The subsequent step involved the identification of corrective action requests, clarification requests and forward action requests (CAR, CL and FAR) which are presented in Table 3 of Appendix A of this report.

A complete list of all documents and records reviewed is as attached in Section 6.0 of this report.

Major changes between the PDD version published for the global stakeholder comment period and the final version submitted for registration are as follow:

- FFB processed changed from 232,558t/yr to 229,685t/yr
- POME produced changed from 162,790m³/yr to 160,780m³/yr
- Estimated ER changed from 27,342tCO₂e/yr to 24,369tCO₂e/yr
- Revised project boundary Figure 2
- BE_{ww,discharge,y} and PE_{ww,discharge,y} not considered
- EC_{BL,k,y}, EF_{EL,k,y} and TD_{L,k,y} removed from B.6.2
- Q_{ww,i,y} and COD_{ww,discharge,BL,y} removed from B.6.2
- COD_{ww,discharge,PJ,y} removed from B.7.1
- W_{CH4,y,flare}, W_{CH4,y,engine} and W_{CH4,y,boiler} included in B.7.1
- BG_{burnt,y,flare} (FV_{RG,h}), EC_{PJ,j,y} and 'end use of final sludge' included in B.7.1
- Additional parameter from the latest methodological tool "project emissions from flaring"

2.2 Follow-up interviews

SIRIM QAS Intl. conducted visits to the project site from 28-29 February 2012 to confirm the information and to resolve issues identified in the document review. The table below provides a list of all persons interviewed and the main topics covered.

NAME	ORGANISATION	TOPICS
Lim Tai Chew Noreda Basar Seetha Erriah Chiah Wai Chun Cheh Koon Chee Tan Kai Yuun	Prosper Palm Oil Mill Green Lagoon Technology	<ul style="list-style-type: none"> • General information about the project & the PDD • Status of project activity • Baseline determination • Monitoring and management • Project barrier and additionality • Financial analysis • Stakeholder consultation • Operation and maintenance procedures • Training requirements • Equipment specifications • Approvals from authority • Calibration and maintenance requirements for the equipment • Potential risk and the emergency procedure
Abdul Karim Mudiarasen	Prosper Palm Oil Mill Felda Serting Hilir Palm Oil Mill	<ul style="list-style-type: none"> • Local stakeholders consultation

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve the corrective action requests and clarifications and any other outstanding issues which needed to be clarified prior to SIRIM QAS Intl. positive conclusion on the project design. During the validation process, two (2) CARs and eighteen (18) CLs were raised.

All the CARs and CLs were resolved during this phase. In order to ensure the transparency of the validation process, the concerns raised and responses that were given are summarized in Section 3 of this report and documented in more detail in Table 3 of the Validation Protocol in Appendix A. All the corrective actions have been incorporated into the PDD (version 3.4)^{/42/} and CER calculation spreadsheet (version 3.3)^{/43/}.

2.4 Internal quality control

SIRIM QAS Intl. has established an internal quality control process. A Technical Reviewer was appointed to review the final draft validation report and the final validation report. The comments made by the Technical Reviewer were taken into consideration and incorporated in the final report.

The final report (after resolutions of all findings) was then submitted to the CDM Quality Manager for review and approval.

3.0 VALIDATION FINDINGS

3.1 Participation requirements

Green Lagoon Technology Sdn Bhd of Malaysia and Camco South East Asia Ltd of the United Kingdom of Great Britain and Northern Ireland are the project participants for the project activity. Malaysia as the host party and United Kingdom of Great Britain and Northern Ireland as the Annex 1 party meet the requirements to participate in the CDM. Malaysia ratified the Kyoto Protocol on 4 September 2002 while United Kingdom of Great Britain and Northern Ireland ratified on 31 May 2002. The ratification and acceptance dates to Kyoto Protocol were further confirmed from the UNFCCC website.

The Letter of Approval (LoA)^{/30/} from the DNA of Malaysia was issued on 12 October 2012 while the LoA from the DNA of United Kingdom of Great Britain and Northern Ireland was issued on 19 November 2012^{/21/}. Both LoAs were provided to the validation team by the PP. The validation team does not doubt the authenticity of the LoAs.

The LoA^{/30/} issued by the DNA of Malaysia was reviewed and deemed appropriate in confirming the following:

- Malaysia is party to the Kyoto Protocol;
- CDM is a voluntary participation,
- The proposed project will assist in Malaysia's sustainable development;
- The project title is in line with the title mentioned under section A.1 of the PDD.

The LoA^{/21/} issued by the DNA of the United Kingdom of Great Britain and Northern Ireland affirms that United Kingdom of Great Britain and Northern Ireland:

- has ratified the Kyoto Protocol on 31 May 2002;
- approves voluntary participation in this proposed CDM activity;
- authorizes Camco South East Asia Ltd. as a participant of the proposed CDM project activity;
- the project title is in line with the title mentioned under section A.1 of the PDD.

The validation team has confirmed that the LoAs have met the requirements of paragraph 45-48 of the VVM (version 1.2).

During the on-site validation, the Letters of Approval from the both DNAs have yet to be obtained. CAR1 and CAR2 were raised on this issue. The CARs were closed after the approvals were provided to the validation team. Details of the findings and the resolutions are as in Table 3 of Appendix A of this report.

3.2 Modalities of Communication

A statement of Modalities of Communication (MoC)^{/18/} with the EB and UNFCCC secretariat has also been issued and signed by authorized persons of both project participants. The MoC^{/18/} is found to be appropriate as it has clearly defined the responsible parties for communicating with EB and UNFCCC secretariat regarding the issuance of CER of the proposed CDM project. The latest template of the MoC^{/18/} was used, i.e. version 01.4, dated 25 July 2011.

3.3 Project Design Document

It has been confirmed that the PDD format version 3 is used. The PDD has been completed in accordance to the Guidelines for Completing the Simplified Project Design Document (CDM-SSC-PDD).

3.4 Description of Project Activity

The "Methane Recovery and Utilization at Prosper Palm Oil Mill, Malaysia" (hereafter referred to as the project activity) is a methane capturing and utilizing project developed by Green lagoon Technology Sdn Bhd (hereafter referred to as the project participant). The proposed project activity is to be implemented at Prosper Palm Oil Mill Sdn Bhd (hereafter referred to as the mill) located in Bahau, Negeri Sembilan, Peninsular Malaysia. The GPS coordinates of the project activity are 2° 53.356' N, 102° 31.331' E. The coordinates have been confirmed using the Google Maps application. The current mill processing capacity is 60 tonnes of Fresh Fruit Bunches (FFBs) per hour. This is based on the written approval^{/17/} issued by the Department of Environment to the palm oil mill.

The processing of fresh fruit bunches (FFB) into crude palm oil and palm kernels, generates large amounts of organic rich wastewater known as the palm oil mill effluent (POME) which is currently treated in the open anaerobic lagoons system. The anaerobic treatment process produces large amounts of methane which is freely released to the atmosphere. The aim of the project is to reduce GHG emissions from the current open lagoons system where the anaerobic decay of organic matter in the ponds results in the production of biogas containing methane, continuously emitted into the atmosphere. In the baseline system, the POME is treated in one cooling pond, five anaerobic ponds, and two facultative ponds, prior to discharge to the nearby plantation for land application. This is evident from the letter to estate owners regarding the land application^{/23/}.

The project activity will include the covering of the two existing anaerobic lagoons with synthetic high-density polyethylene (HDPE) lining which can create an in-ground anaerobic reactor system. The material used for the cover is made from synthetic high-density polyethylene (HDPE) geomembrane. It is sealed by means of strip-to-strip welding. A peripheral anchor trench is dug around the perimeter of the existing lagoons as a mean of securing the membrane. The in-ground anaerobic reactor system is fitted with multiple inlet pipes at the bottom of the lagoon where the untreated POME is fed. The multiple inlets encourage better mixing of the POME and better interaction with the bacteria in the POME. Several sludge removal pipes will also be installed in the covered lagoon system to allow for sludge removal in the event of sludge build-up in the system. The treated POME from the covered lagoons will continue to flow through the entire existing lagoons system (as in baseline) to ensure the discharge meets the requirements of the legal.

The recovered biogas will be used as a source of renewable energy to generate electricity and/or heat for mill use. However, the utilization of biogas for renewable energy is not part of the CDM

project activity. Therefore, credits from the renewable energy generation component will not be claimed. Two units of biogas engines which will have a total capacity of 1,000kW_{elec} will be installed to generate electricity for the project and mill use. Additional biogas will be combusted in the existing biomass boiler for steam generation and any excess of biogas will be channelled to an enclosed flare system^{/16/}.

The validation team has confirmed the design description of the project activity. It was confirmed based on the design engineering drawings^{/26/} of the proposed project activity, biogas engine technical data^{/24/}, flare system technical specifications^{/31/} and drawings^{/32/} of the layout of lagoons.

The funding for the project does not lead to a diversion of official development assistance (ODA). ODA does not contribute to the financing of the project. This was confirmed based on the contract agreement between Green Lagoon Technology (PP) and Prosper Palm Oil Mill^{/8/}.

The project activity is not a debundled component of a large project activity since the project participant does not have any other CDM small-scale project activities in the same project category and technology measure registered within the previous 2 years and does not have any other CDM project activity within 1km of the project boundary of the proposed project activity. These have been verified by checking the CDM web site, by visiting the project site and by interviewing the PP.

Expected operational lifetime of the project activity was 10 years based on the recommendation by the HDPE's manufacturer^{/39/}.

During the validation, two (2) CLs were raised as follow:

- CL1 was raised asking PP to provide supporting documents for the major equipment, such as, ponds cover system, biogas engines, biogas burner and enclosed flare.
- CL5 was raised asking PP to clarify the expected lifetime of the project activity.

Details of the findings and the resolutions are as in Table 3 of Appendix A of this report.

3.5 Baseline and Monitoring Methodology

The baseline and monitoring of this project activity was based on the following approved methodology, guidelines and tools:

- AMS-III.H "Methane recovery in wastewater treatment" (version 16)^{/2/}.

In line with the methodology AMS-III.H, the following tools are used,

- Tool to calculate baseline, project and/or leakage emissions from electricity consumption (version 1)^{/4/},
- Project emissions from flaring (version 2.0.0)^{/3/}
- Non-binding best practice examples to demonstrate additionality for SSC project activities^{/5/}, EB35 Annex 34.

3.5.1 Applicability of the Selected Methodology

The project activity applies approved baseline and monitoring methodology AMS-III.H (version 16)^{/2/} 'methane recovery in wastewater treatment'. The project fulfills the applicability of AMS-III.H version 16 as follows:

- The proposed project activity will introduce biogas recovery and combustion to an existing anaerobic wastewater treatment system such as anaerobic lagoons. The validation team has confirmed based on the scope of works defined in the contract agreement^{/8/} and based on the drawings of ponds layout^{/32/}. This is in line with paragraph 1(d) of the AMS-III.H.
- Paragraph 2 of the methodology specifies that the baseline system is anaerobic lagoon. The methodology is applicable if a) the lagoons are ponds with a depth greater than 2 metres, without aeration; b) ambient temperature above 15°C, at least during part of the

year, on a monthly average basis and c) the minimum interval between two consecutive sludge removal events shall be 30 days. During the validation and on-site visit, PP had provided the drawing for the existing wastewater treatment system^{/32/} which confirmed that the ponds are greater than 2 metres in depth and do not have aeration. The ambient temperature in Malaysia, and in particular the state of Negeri Sembilan where the project site is located is always above 15°C^{/46/}. The minimum interval between two consecutive sludge removal events is more than 30 days. It was confirmed that the last desludging activities were carried out in May 2011. This was evident from the application for desludging works in May 2011 from the state Department of Environment^{/20/}. The anaerobic ponds cleaning works were completed in September as evident from the report^{/22/} submitted to the Department of Environment.

- The proposed project activity will utilize the recovered biogas as renewable energy for thermal and electricity generation. The recovered biogas will be combusted in gas engine for electricity generation and in existing biomass boiler for steam generation. This is in line with paragraph 3(a) of AMS-III.H. However, the utilization of these renewable energy components is not part of the proposed CDM project activity. PP will not claim any emission reductions from generation of renewable energy, thus methodologies under type I are not applicable.
- The project activity is not a Greenfield project and does not involve a change in equipment resulting in a capacity addition of wastewater treatment system. The on-site visit to the wastewater treatment plant confirmed that the project activity converts two of the existing anaerobic lagoons into covered in-ground anaerobic reactor system. This was further cross checked with the contract agreement^{/8/} between the mill owner and the PP. Therefore, paragraph 12 of AMS-III.H is not applicable to this project activity.
- The location of the wastewater treatment plant has been uniquely defined in Section A.4.1.4 of the PDD. This was further confirmed by validation team during the site visit to the project site.
- The aggregate emission reductions for all Type III components of the project activity are less than 60ktCO₂e annually. The total emission reductions from the project are estimated to be 24,369tCO₂e per year over the selected 10-year crediting period.

Based on the project design^{/26/} and contract agreement^{/8/} between the mill owner and the PP, the validation team confirmed that paragraphs 5 – 11 of the AMS-III.H are not relevant to the proposed project activity. The validation team hereby confirms that the selected baseline and monitoring methodology AMS-III.H (version 16) was previously approved by the CDM Executive Board, and is applicable to the project activity, which complies with all the applicability conditions therein. This is in compliance with paragraph 76 of VVM (version 1.2).

During the validation, two (2) clarification requests were raised as follow:

- CL2 was raised where the validation team required supporting documents or references for the depth of ponds and the ambient temperature of the project site.
- CL15 was raised on desludging records and evidence of the sludge being soil applied.

Details of the findings and the resolutions are as in Table 3 of Appendix A of this report.

3.5.2 Project Boundary

As per paragraph 15 of AMS-III.H (version 16), *the project boundary is the physical, geographical site where the wastewater treatment and sludge treatment takes place in the baseline and project scenario. It also covers all facilities affected by the project activity including sites where processing, transportation and application or disposal of waste products as well as biogas takes place.*

The project system boundary starts from the inlet point to the covered ponds, the gas engine, the boiler and the flare system where biogas will be combusted. The other existing anaerobic ponds which are not covered and the facultative ponds are also included in the project boundary.

The project boundary was assessed by conducting physical site inspection, interviews and reviewing supporting document on the design of the project^{/24/31/32/}. From the assessment, the validation team confirmed that the identified boundary and the selected sources and gases as documented in PDD are justified for the project activity. Methane (CH₄) is indicated as the main source of the baseline emissions, which is correct as per the project activity and the applicable methodology. The validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by AMS-III.H. (version 16).

It can be concluded that the identified boundary and the selected sources and gases as documented in the PDD are justified for the project activity.

In this section, one CL was raised as follow:

- CL9 was raised asking PP to correct the justification for the exclusion of CO₂ as a source of emission as stated in Table 5 of the PDD.

Details of the findings and the resolutions are as in Table 3 of Appendix A of this report.

3.5.3 Baseline Identification

The discharge of POME into watercourse or land application in Malaysia is regulated by the Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations 1977^{/47//50/} where it is prohibited by the regulation to discharge the untreated POME into land application or watercourse. The PDD had identified the baseline scenario as the existing anaerobic wastewater treatment system (i.e. open anaerobic lagoon system) without methane recovery system. In the absence of the project activity, the wastewater from the palm oil mill would continue to be treated using the existing practice of open anaerobic lagoons where methane generated as a result of anaerobic degradation of biogenic materials, would have escaped into the atmosphere. The open lagoon system without methane recovery is able to treat the wastewater and meet the current environmental standards^{/47//50/} which specifies that the final discharge of the treated POME shall be within 100mg BOD/litre. Currently, there is no discharge standard for COD. There are no policies or legislation^{/47//50/} that prevent the existing open lagoon system from continuing operation. The regulations also do not stipulate the type of wastewater treatment technology for treating the POME. There are also no existing, pending or planned national policy or regulatory requirements^{/9/} that govern the GHG emissions from agro-industry operations (specifically palm oil mill processing activities). With the above justifications, it is the validation team's opinion that the treatment of wastewater from the palm oil mill in the open anaerobic ponds without methane recovery is the baseline scenario for the project activity.

3.6 Additionality

According to 'Guidelines on the demonstration of additionality of small-scale project activities'^{/27/} (version 09.0), the proposed project activity is considered additional if it can be demonstrated that the project activity would not have occurred anyway due to at least one of the following barriers: (a) investment barriers; (b) technological barrier; (c) barrier due to prevailing practice; and (d) other barriers.

For the project activity, PP had chosen to demonstrate the additionality through investment barrier.

3.6.1 Prior Consideration of the CDM

As per the CDM Guidance (Glossary of CDM Terms, ver. 06), the start date shall be considered to

be the earliest date at which either the implementation or construction or real action of a CDM project activity begins. For this project activity, the start date was taken as 28 November 2011, following the date of issuance of purchase order of major equipment^{/13/} by the PP. With the issuance of the purchase order, PP had committed to expenditures related to the implementation of the project. Hence, the start date was in accordance with the "Glossary of CDM Terms", and fulfills the requirements of paragraph 99 of VVM (version 1.2).

In accordance with EB 62 Annex 13 'Guidelines on the demonstration and assessment of prior consideration of the CDM'^{/48/}, the project activity with start date after 2 August 2008, falls under new project activity which requires PP to inform the Host Party designated national authority (DNA) and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status. Accordingly, PP had submitted the Prior Consideration Form to the UNFCCC Secretariat^{/12/} on the 19 September 2011, and notification to the DNA of Malaysia on 17 September 2011^{/11/}. The form is also available in the UNFCCC website^{/49/}.

The chronicle events for CDM consideration is listed in Table 6, Section B.5 of PDD and a summary as below:

Date	Events/activities
5 Mar 2011	Green Lagoon proposed the concept of CDM project to Prosper Palm Oil Mill
13 Apr 2011	Green Lagoon conducted feasibility study on the proposed project ^{/10/}
9 May 2011	Green Lagoon signed contract with Prosper Palm Oil Mill ^{/8/}
13 Jun 2011	Green lagoon designed the covered in-ground anaerobic reactor to two existing anaerobic lagoons
17 Sep 2011	Notified Host Party DNA ^{/11/}
19 Sep 2011	Notified UNFCCC Secretariat ^{/12/}
12 Oct 2011	UNFCCC confirmed on the notification ^{/12/}
10 Nov 2011	Received EIA exemption ^{/19/}
28 Nov 2011	Purchase Order issued for major equipment ^{/13/} , (the project start date)
21 Dec 2011	Construction start date ^{/25/}
28 Jan 2012	Webhosting of the PDD
30 Mar 2012	Estimated start date of operation ^{/25/}
30 May 2012	ERPA signing between Green Lagoon Technology Sdn Bhd and Camco South East Asia Ltd ^{/29/}

The period of time from the decision of the board meeting to develop the project activity, to the time of the web hosting of the PDD was less than 2 years. Hence, it is concluded that continuing and real actions were taken to secure CDM status for the project activity This is in line with the Guidelines on the demonstration and assessment of prior consideration of CDM as defined in the EB 62, Annex 13.

3.6.2 Investment Barrier

The baseline scenario for the project activity is continuation operation of the existing open pond treatment system without methane recovery and combustion. There is no existing, pending, or planned national, state, or local regulatory requirements that govern GHG emissions from wastewater treatment operations. The baseline option (business as usual) is financially attractive because it represents the lowest cost option but results in continual methane emission to atmosphere. The existing open pond wastewater treatment concept used by the palm oil mill is able to treat the POME to meet the discharge limit set by the Department of Environment. The Department of Environment continues to approve open pond wastewater treatment systems whether for new mills or upgraded mills since this method is the most economical to operate and is able to meet the discharge limits.

According to Attachment A to Appendix B of the "Indicative simplified baseline and monitoring

methodologies for selected small-scale CDM project activity categories^{127/} and EB 35 Annex 34 "Non-binding best practice examples to demonstrate additionality for SSC project activities^{15/}, the project participants have chosen investment barrier in order to demonstrate the additionality of the project.

Simple cost analysis has been selected for demonstrating the additionality. The validation team has confirmed that the project participant does not get any kind of financial or economic benefit by the project activity except CER's. Therefore, the application of simple cost analysis in the assessment of investment analysis is reasonable and justified.

The validation team has reviewed the agreement signed between PP and the mill owner (Prosper Palm Oil Mill Sdn Bhd), dated 5 May 2011^{8/} and confirmed that PP is fully accountable for the investment and installation (conversion of the lagoons into digester, flaring and monitoring systems) as well as for the corresponding operating and maintenance costs (including the operation and maintenance activity). The agreement also clearly stated that the mill owner is responsible for installation of equipment related to the generation of the renewable biogas^{8/}.

From the review of the agreement^{8/} signed between the PP and the mill owner, the PP will only claim CERs through the avoidance of methane generation from the palm oil mill effluent. There will be no CERs claim for the renewable energy component. Any revenues or cost savings for electricity or heat generation will remain with mill owner, and not the PP. The project activity will not gain any other monetary benefits through the savings from the use of the biogas for renewable energy purposes.

The project itself does not create any revenues other than potential earnings from the generation of CER's. The proposed project activity cannot be considered economically and financially viable without revenues generated from the sale of CERs. Since the only revenues for the project activity is expected only to be from the sales of CERs, the demonstration of simple cost analysis is considered appropriate.

In the simple cost analysis assessment, PP has identified two alternatives to the proposed project activity. They are

Alternative 1: Methane recovery by using covered in-ground anaerobic digester and utilization for heat and electricity generation (proposed project without CDM assistance)

Alternative 2: Open lagoons system without biogas recovery (continuation of the current situation).

Detailed assessment and calculation is provided in the *Prosper_FA_Version_5 Final Validation*^{44/} Excel sheet. The validation team has reviewed the values of the input parameters and the financial indicator used. The capital investment required is RM 2,032,815. The validation team had reviewed the following input values indicated in the spreadsheet^{44/}.

Parameter	Reference Documents / Evidences																
Capital Investment cost	<p>It was based on purchase order issued on 28 November 2011 where it covers supply of material, labour and machineries, delivery, construction, testing and commissioning of the project activity^{13/}. The details as follows:</p> <table border="1"> <thead> <tr> <th>Particulars</th><th>Amount</th></tr> </thead> <tbody> <tr> <td>Preliminary works</td><td>RM 127,300.00</td></tr> <tr> <td>Works inside lagoon system</td><td>RM 421,918.00</td></tr> <tr> <td>Works for covered lagoon system</td><td>RM 741,550.00</td></tr> <tr> <td>Mechanical equipment</td><td>RM 159,000.00</td></tr> <tr> <td>Electrical works</td><td>RM 59,900.00</td></tr> <tr> <td>Miscellaneous works</td><td>RM 102,896.00</td></tr> <tr> <td>CDM construction: equipment, monitoring and data recording</td><td>RM 430,251.00</td></tr> </tbody> </table>	Particulars	Amount	Preliminary works	RM 127,300.00	Works inside lagoon system	RM 421,918.00	Works for covered lagoon system	RM 741,550.00	Mechanical equipment	RM 159,000.00	Electrical works	RM 59,900.00	Miscellaneous works	RM 102,896.00	CDM construction: equipment, monitoring and data recording	RM 430,251.00
Particulars	Amount																
Preliminary works	RM 127,300.00																
Works inside lagoon system	RM 421,918.00																
Works for covered lagoon system	RM 741,550.00																
Mechanical equipment	RM 159,000.00																
Electrical works	RM 59,900.00																
Miscellaneous works	RM 102,896.00																
CDM construction: equipment, monitoring and data recording	RM 430,251.00																

	(discount)	-RM 10,000.00	
	Total project cost	RM 2,032,815.00	
Operational & maintenance expenditure	The operating expense (OPEX) is 11.5% of the project investment cost (CAPEX). The OPEX value was based on the lowest among seven registered CDM project in West Malaysia using same type of methodology and technology. Links to these registered project is provided in the reference ^{/51/} .		

In conclusion the values used for the estimation of the baseline NPV can be considered appropriate and justified.

In this assessment, the selected financial indicator is net present value (NPV). Below is the summary of the investment analysis,

Alternatives	CAPEX (RM)	OPEX (RM)	NPV (RM)
Alternative 1	2,032,815	233,774	Negative value
Alternative 2	0	0	0

From the investment analysis conducted, it is agreed that the Alternative 2 (open lagoons system without biogas recovery) is considered as the most economical or financially attractive project activity. The palm oil mill currently uses an anaerobic lagoon system without biogas recovery to treat POME before released for land application. From the analysis conducted, the proposed project is agreed to be financially or economically not attractive and the proposed project is additional. Based on the assessment of the conformity of additionality demonstration, plausibility and appropriateness of parameters used and correctness of financial calculations, the validation team concludes that the project scenario is not economically feasible without benefits from the CER sales.

In this section, one clarification was raised as follow:

- CL3 was raised asking PP to provide supporting document on the capital expenditure (CAPEX).
- CL4 was raised asking for supporting documents for FFB amount used and the operating expenses (OPEX).

Detail findings and the resolutions are as in Table 3 of Appendix A of this report.

3.7 Monitoring Plan

The monitoring plan presented in the PDD^{/1/} conforms to the approved baseline and monitoring methodology AMS-III.H (version 16). The monitoring plan is also in line with the 'Tool to calculate baseline, project and/or leakage emissions from electricity consumption'^{/4/} and the 'Project emissions from flaring'^{/3/}. The validation team has checked all parameters as presented in the monitoring plan of the latest version of the PDD^{/42/} against the requirement of the methodology.

The project will be equipped with an extensive monitoring system. The information related to the monitoring system was reviewed by the validation team. Various training for the staffs have been identified by the technology provider and the monitoring plan has been established to maintain the performance of the installed equipment and the technology as well as to ensure the accuracy of measurements and data reported. There will be an operational and management team established, which will be responsible to operate and maintain the wastewater treatment system and implement the monitoring plan. The team will be responsible for daily monitoring of the processes in accordance to the quality assurance and control of each parameter as per the monitoring plan. The aggregated monitored and recorded data will be stored electronically and in hard copy format up to 2 years after the end of crediting period or the last issuance of CERs, whichever was later.

3.7.1 Parameters Determined Ex-Ante

The following data and parameters were available during validation :

Parameter	Value applied	Description
GWP_{CH_4}	21 tCO_2e/tCH_4	Global Warming Potential (GWP) of methane. IPCC default value specified in AMS III.H version 16.
$B_{o,ww}$	0.25 $tCH_4/tCOD$	Methane producing capacity of the wastewater. Default value specified in AMS-III.H version 16 is used.
UF_{BL}	0.89	Model correction factor to account for model uncertainties in the baseline emission calculations. Default value specified in AMS-III.H version 16 is used.
UF_{PJ}	1.12	Model correction to account for model uncertainties. Default value specified in AMS-III.H version 16 is used.
$MCF_{ww,treatment,BL}$	0.8	Methane correction factor for the baseline anaerobic wastewater treatment system. Default value for anaerobic deep pond specified in Table III.H.1 of AMS-III.H. version 16 is used.
$MCF_{ww,BL,discharge}$	0.0	Methane correction factor of baseline and project wastewater treatment system sent to plantation for irrigation purpose in the year y. Default value specified in in Table III.H.1 of AMS-III.H version 16 is used.
$MCF_{ww,treatment,PJ,k}$	0.8	Methane correction factor for project activity equipped with biogas recovery in the year y. Default value specified in in Table III.H.1 of AMS-III.H version 16 is used.
CFE_{ww}	0.9	Capture efficiency of the biogas recovery equipment in the wastewater treatment system. Default value specified in AMS-III.H version 16 is used.
$D_{CH_4,y}$	$0.716kg/m^3$	Density of methane at temperature and pressure of the biogas at normal conditions, from 'Project emissions from flaring' ^{1/3/} .
$EF_{EL,j,y}$	1.3 tCO_2/MWh	Based on <i>Scenario B: Electricity consumption from (an) off-grid fossil fuel fired captive power plant(s)</i> of the 'Tool to calculate baseline, project and/or leakage emissions from electricity consumption' ^{1/4/} , Version 1, Option B2.
$TDL_{j,y}$	0	In case of Scenario B of the 'Tool to calculate baseline, project and/or leakage emissions from electricity consumption' ^{1/4/} , version 1.

In this section, two clarifications were raised as follow:

- CL10 was raised where it was not clear the values applied for parameters EF and TDL; and error was observed in converting kWh to MWh.
- CL11 was raised asking PP to correct the $B_{o,ww}$ and MCF values for $PE_{ww,treatment,y}$, $PE_{ww,discharge,y}$ and $PE_{fugitive,y}$ used in the ER calculations.

Detail findings and the resolutions are as in Table 3 of Appendix A of this report.

3.7.2 Parameters Determined Ex-Post

The baseline and project emissions parameters that are to be monitored ex post were indicated in Section B.7.1 of the PDD and are as follows:

Parameters	Description
------------	-------------

$Q_{ww,y} (m^3)$	Volume of wastewater treated in project wastewater treatment system k in year y
$COD_{ww,untreated,y} (COD_{inflow,k,y}) (tCOD/m^3)$	Chemical oxygen demand of the wastewater inflow to the project wastewater treatment system k in year y
$COD_{ww,treated,y} (COD_{outflow,k,y}) (tCOD/m^3)$	Chemical oxygen demand of the wastewater outflow from the project wastewater treatment system k in year y
$w_{CH4,y,flare} (%)$	Concentration of methane in the biogas entering the flare in the year y
$w_{CH4,y,engine} (%)$	Concentration of methane in the biogas entering the gas engines in the year y
$w_{CH4,y,boiler} (%)$	Concentration of methane in the biogas entering the biomass boiler in the year y
$BG_{burnt,y,flare} (FV_{RG,h}) (m^3/hr)$	Volumetric flow rate of the residual gas in dry basis at normal conditions entering the flare in the hour h
$\eta_{flare,h} (FE) (%)$	Flare efficiency of enclosed flare in hour h based on default values
$T_{flare} (^{\circ}C)$	Temperature in the exhaust gas of the flare
$BG_{burnt,y,engine} (m^3/yr)$	Volumetric flow rate of biogas in dry basis at normal conditions entering the gas engines in year y
$BG_{burnt,y,boiler} (m^3/yr)$	Volumetric flow rate of biogas in dry basis at normal conditions entering the biomass boiler in year y
$EC_{PJ,j,y} (MWh/yr)$	Quantity of electricity consumed by the project electricity consumption source j in year y
End use of final sludge	Monitoring records of the end use of sludge.
$T_{FG,m} (^{\circ}C)$	Temperature in the exhaust of the enclosed flare in minute m
Flame _m (on/off)	Flame detection of flare in the minute m
Maintenance	Maintenance events completed in year y for flaring equipment
$M_{t,db} (kg/h)$	Mass flow of the gaseous stream in time interval t on a dry basis
$T_t (K)$	Temperature of the gaseous stream in time interval t
$P_t (Pa)$	Pressure of the gaseous stream in time interval t
$V_{k,t,db} (m^3_{gas,k}/m^3_{dry\ gas})$	Volumetric fraction of gas k in the gaseous stream in time interval t in dry basis

The validation team has reviewed the GHG indicators, parameters, monitoring methods, frequencies and the measurement equipment. It is agreed to be reasonable and appropriate. The information for each parameter regarding the sources of data, measurement methods, calibration procedures, responsible personnel, measurement interval and QA/QC procedures were adequately described as per the guidelines for completing the SSC-PDD.

The project will be equipped with a monitoring system. The monitoring system was reviewed by the validation team through document review and interviews with relevant personnel. This information together with the physical inspection of the project site allowed the validation team to conclude that the proposed monitoring plan defined in the PDD is feasible within the project activity and the PP should be able to implement the monitoring as planned. The monitoring data will be archived

electronically and be kept for two years after the end of the last crediting period. Details of the data to be collected and frequency of data recording were also described in the monitoring plan.

In this section, three clarifications were raised as follow:

- CL6 was raised asking PP to rectify the calibration procedures to be in line with the 'General Guidelines to SSC CDM methodologies'.
- CL7 was raised on monitoring points for methane concentration measurement.
- CL8 was raised asking PP to clarify the need to monitor the 'other flare operation parameter', the electricity consumption and the 'end use of final sludge'.

Detail findings and the resolutions are as in Table 3 of Appendix A of this report.

3.8 Calculation of GHG Emissions

The validation team confirmed that details of direct and indirect emissions discussed in the PDD were appropriate and covered all aspects of the project activity. In this proposed project activity, methane (CH₄) and carbon dioxide (CO₂) emissions have been considered as the GHG emissions.

The validation team has assessed the calculations of the project emissions, baseline emissions, and leakage and emission reductions in the *Prosper Biogas Project CERs Calculation Final Validation* Excel Sheet^{/43/}. It was confirmed that the calculation for the emission reductions is in accordance with methodology AMS-III.H (version 16). The formulae used in the calculations of the emission reductions were correct and have been transparently documented in the Excel Sheet^{/43/}.

The parameters and equations presented in the PDD and further documentation were compared with the information and requirements presented in the methodology and respective tools. The equation comparison was made explicitly following all the formulae presented in the spreadsheet. The assumptions and data used to determine the emission reductions are listed in the PDD and all the sources have been checked and confirmed. Based on the information reviewed, it can be confirmed that the sources used were correctly quoted and interpreted in the PDD. Detailed information on the validation of the parameters used in the equations can be found in Appendix A.

3.8.1 Baseline Emissions

In accordance with equation (1) in paragraph 18 of AMS-III.H. (version 16), the baseline emissions are calculated based on the following formula:

$$BE_y = \{BE_{power,y} + BE_{ww,treatment,y} + BE_{s,treatment,y} + BE_{ww,discharge,y} + BE_{s,final,y}\}$$

Where :

BE_y	Baseline emissions in year y (tCO ₂ e)
$BE_{power,y}$	Baseline emissions from electricity or fuel consumption in year y (tCO ₂ e)
$BE_{ww,treatment,y}$	Baseline emissions of the wastewater treatment systems affected by the project activity in year y (tCO ₂ e)
$BE_{s,treatment,y}$	Baseline emissions of the sludge treatment systems affected by the project activity in year y (tCO ₂ e)
$BE_{ww,discharge,y}$	Baseline methane emissions from degradable organic carbon in treated wastewater discharged into sea/river/lake in year y (tCO ₂ e).
$BE_{s,final,y}$	Baseline methane emissions from anaerobic decay of the final sludge produced in year y (tCO ₂ e)

In the *ex-ante* baseline emissions calculation, BE_{power} was considered as zero as the electricity consumed for the baseline wastewater treatment is supplied by the electricity generated by steam powered turbine generated from biomass boiler. $BE_{s,treatment,y}$ and $BE_{s,final,y}$ were not considered as the baseline scenario does not involve the use of a sludge treatment system and any sludge produced in the baseline was used as aerobic soil application. $BE_{ww,discharge,y}$ is also not applicable to the project as the treated wastewater as in the baseline is discharge to plantation for land

Hence, baseline emissions for the systems affected by the project activity are

$$BE_y = BE_{ww,treatment,y}$$

For the calculation of the $BE_{ww,treatment,y}$ equation (2) in paragraph 20 of AMS-III.H. is applied. In the baseline wastewater treatment. The key data used in calculations of the ex-ante baseline emissions are as below table. For full details refer to Section B.4 of PDD.

Parameter	Value	Justification
$Q_{ww,i,y}$	Value as in the PDD	<p>For <i>ex ante</i> estimation, forecasted wastewater generation based on the forecasted FFB production multiplied with an effluent conversion factor.</p> <p>The forecasted FFB is based on the information provided by the Mill as it is based on the availability of the FFB during the crediting period. This is found to be within the licensed issued by the Department of Environment^{/17/}.</p> <p>An effluent conversion factor of 0.7 m³ of POME for each tonne of FFB processed was used. This factor was based on a publication^{/9/} by the Malaysian Department of Environment.</p>
$COD_{ww,untreated,y}$ ($COD_{inflow,k,y}$)	0.05569t/m ³	The COD value was based on a 11-day measurement campaign ^{/37/38/} of the wastewater entering the baseline wastewater system. In accordance with paragraph 27, the average values determined during this campaign were multiplied by 0.89 to account for the uncertainty.
$COD_{ww,treated,y}$ ($COD_{outflow,k,y}$)	0.00270t/m ³	The COD value was based on a 11-day measurement campaign ^{/37/38/} of the wastewater entering the baseline wastewater system. In accordance with paragraph 27, the average values determined during this campaign were multiplied by 0.89 to account for the uncertainty.
$\eta_{COD,BL,i}$	87.72%	<p>The COD removal efficiency was calculated based on the difference of COD_{inflow} and $COD_{outflow}$ over the total COD_{inflow}. Detail of the calculation is provided in ER spreadsheet^{/43/}.</p> <p>The values for COD_{inflow} and $COD_{outflow}$ were based on a 10-day measurement campaign^{/37/38/} of wastewater leaving the baseline wastewater treatment system.</p> <p>In accordance with paragraph 27, the average values determined during this campaign were multiplied by 0.89 to account for the uncertainty.</p>

The COD of the wastewater was based on a 11-day measurement campaign as there were no history records on the monitoring of this parameter prior to the project implementation. There was no regulatory limit provided in the conditions set by the Department of Environment^{/50/} for the wastewater discharge. The current environmental standards^{/50/} only specifies that the final discharge of the treated POME for BOD. Hence, the use of the measurement campaign which is also in accordance with paragraph 27 is acceptable. An 11-day measurement campaign was carried out from 27 October to 10 November 2011^{/37/38/}. Default values from the IPCC 2006 and from AMS III.H, where applicable were also used in the calculations. These values were selected based on the methodology requirements and found to be correctly applied. Detailed calculation is

provided in Annex 3 of the PDD and in CER Calculation Excel sheet^{/43/}.

The validation team has reviewed the respective documents submitted and deemed appropriate. The values applied are conservative and plausible.

In this section, two clarifications were raised as follow:

- CL13 was raised asking PP to correct the description for $BE_{s,treatment,y}$ and $BE_{s,final,y}$.
- CL16 was raised on the application of the uncertainty factor of 0.89.

Detail findings and the resolutions are as in Table 3 of Appendix A of this report.

3.8.2 Project Emissions

All aspects related to direct and indirect project emissions have been taken into consideration in the calculation. It was confirmed during the site audit that all aspects of direct PE have been included in the calculation with relevant GHG i.e. CH_4 and CO_2 and its sources, wastewater from palm oil mill were evaluated.

Referring to the formula in AMS-III.H version 16, the project emissions for the project activity are calculated as follows:

The project emission is determined based on the formula in paragraph 29 of AMS III.H. (version 16):

$$PE_y = PE_{power,y} + PE_{ww,treatment,y} + PE_{s,treatment,y} + PE_{ww,discharge,y} + PE_{s,final,y} + PE_{fugitive,y} + PE_{biomass,y} + PE_{flaring,y}$$

Where:

PE_y	Ex-ante project activity emissions due to methane recovery in the year y (tCO_2e).
$PE_{power,y}$	CO_2 emissions from electricity or fuel consumption by the project activity (tCO_2e).
$PE_{ww,treatment,y}$	Methane emissions from wastewater treatment systems affected by the project activity and not equipped with biogas recovery in the project scenario (tCO_2e).
$PE_{s,treatment,y}$	Methane emissions from sludge treatment systems affected by the project activity and not equipped with biogas recovery in the project situation (tCO_2e).
$PE_{ww,discharge,y}$	Methane emissions on account of inefficiency of the project activity wastewater treatment systems and presence of degradable organic carbon in treated wastewater (tCO_2e).
$PE_{s,final,y}$	Methane emissions from the decay of the final sludge generated by the project activity treatment system (tCO_2e).
$PE_{fugitive,y}$	Methane fugitive emissions due to inefficiencies in capture systems (tCO_2e).
$PE_{flaring,y}$	Methane emissions due to incomplete flaring (tCO_2e).
$PE_{biomass,y}$	Methane emissions from biomass stored under anaerobic conditions which would not have occurred in the baseline situation (tCO_2e).

The following project emissions were not accounted for :

- $PE_{s,treatment,y}$ – there is no sludge treatment system in the project activity. This was confirmed in the review of the project design specification and visit to the existing wastewater treatment system. Hence, this source of emissions is not applicable.
- $PE_{ww,discharge,y}$ – the treated wastewater as in the baseline is discharged to plantation for land irrigation
- $PE_{s,final,y}$ – the sludge will be used for land application in aerobic conditions. Therefore, as

per paragraph 29 of AMS-III.H., this can be neglected.

- $PE_{\text{biomass},y}$ – storage of biomass under anaerobic conditions will not take place due to the project activity as the biomass displaced by the project activity will be sold immediately or disposed. It was confirmed during on-site audit that there will be no storage of biomass under the project activity. Hence, emissions from biomass storage can be discounted.

Therefore, project emissions for the systems affected by the project activity are as follow:

$$PE_y = PE_{\text{power},y} + PE_{\text{ww,treatment},y} + PE_{\text{ww,discharge},y} + PE_{\text{fugitive},y} + PE_{\text{flaring},y}$$

For the calculation of $PE_{\text{power},y}$, in accordance with the 'Tool to calculate baseline, project and/or leakage emissions from electricity consumption'^{/4/}, the project emissions from the electricity or fuel consumption is calculated as follow:

$$PE_{\text{power},y} = \sum_m EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$$

where

$EC_{PJ,j,y}$	Quantity of electricity that would be consumed by the project electricity consumption source j in year y (MWh/yr)
$EF_{EL,j,y}$	Emission factor of electricity generation for source j in year y (tCO ₂ /MWh)
$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source j in year y
j	Source of electricity consumption in the project activity

It has been confirmed that the project site has no connection to grid electricity. The electricity for the project activity will be sourced either from the biomass boiler or backup diesel generator. Hence, in accordance with the tool^{/4/}, Scenario B: Electricity consumption from (an) off-grid fossil fuel fired captive power plant(s) is applicable. The emission factor for electricity generation was taken as $EF_{EL,j,y} = 1.3 \text{ tCO}_2/\text{MWh}$, which is found to be correct. In the *ex-ante* calculation, the $PE_{\text{power},y}$ was estimated based on the installed capacity of the equipment multiplied with the expected operating hours, the emission factor for electricity generation. The project activity equipment is assumed to be in operation for 24 hours per day, 365 days per year. The validation team also confirmed that auxiliary power consumption for the project activity was provided by technology provider^{/40/}.

For *ex-post* calculation, the actual quantity of electricity consumed by the project activity equipment will be measured using a power meter.

For the determination of $PE_{\text{ww,treatment},y}$, equation (2) in paragraph 20 of AMS-III.H (version 16) was applied. The removal efficiency ($\eta_{\text{COD},PJ,k}$) for the anaerobic digester in the project activity has been taken as 85%. This value has been accepted by the validation team as it is consistent with covered in-ground anaerobic reactor (CIGAR) projects handled by Asia Biogas^{/36/}. However, for *ex-post*, actual efficiency will be determined based on the monitoring of the required parameters in accordance with the methodology requirement.

As for the $PE_{\text{fugitive},y}$, equation (9) in paragraph 30 of AMS-III.H (version 16) was applied. Since there is no sludge treatment in the project activity, only fugitive emissions through capture inefficiencies in the anaerobic wastewater treatment systems was considered.

As per paragraph 29 of AMS-III.H, for *ex-ante* $PE_{\text{flaring},y}$ estimation, baseline emission calculation for wastewater and/or sludge treatment (i.e. equation 2 of the methodology AMS-III.H, Version 16) can be used but without the consideration of GWP for CH₄. However, the *ex post* emission reduction shall be calculated as per the 'Project emissions from flaring'^{/3/} by using actual monitored data.

The validation team has reviewed the respective documents submitted and deemed appropriate. The values applied are conservative and plausible. Relevant default values were selected based on

the methodology requirements and found to be correctly applied.

During the validation, three CLs were raised as follow:

- CL12 was raised asking PP to rectify the errors in calculating $PE_{flaring,y}$.
- CL13 was raised asking PP to correct the description for $PE_{s,treatment,y}$ and $PE_{s,final,y}$.
- CL14 was raised asking PP to provide the supporting documents for all auxiliary equipment.

Detail findings and the resolutions are as in Table 3 of Appendix A of this report.

3.8.3 Leakage Emissions

There is no leakage in the project activity as the technology used will not involve equipment transferred from another project activity or the existing equipment transferred to another project activity.

3.8.4 Emission Reductions

As required in paragraph 32 of AMS-III.H. (version 16), the estimated *ex ante* emission reductions shall be estimated as follows:

$$ER_{y,ex\ ante} = BE_{y,ex\ ante} - (PE_{y,ex\ ante} + LE_{y,ex\ ante})$$

where

$ER_{y,ex\ ante}$	Ex ante emission reduction in year y (tCO ₂ e)
$BE_{y,ex\ ante}$	Ex ante baseline emissions in year y (tCO ₂ e)
$PE_{y,ex\ ante}$	Ex ante project emissions in year y (tCO ₂ e)
$LE_{y,ex\ ante}$	Ex ante leakage emissions in year y (tCO ₂ e)

The validation team has assessed the calculations of the project emissions, baseline emissions, and leakage and emission reductions. It was confirmed that the calculation for the emission reductions is in accordance with methodology AMS-III.H (version 16). The formulae used in the calculations of the emission reductions were correct and have been transparently documented in the PDD and transparently applied in the Excel spreadsheet^{/43/}.

The parameters and equations presented in the PDD^{/42/} and further documentation was compared with the information and requirements presented in the methodology and respective tools. The equation comparison was made explicitly following all the formulae presented in the spreadsheet. The assumptions and data used to determine the emission reductions are listed in the PDD^{/42/} and all the sources have been checked and confirmed. Based on the information reviewed it can be confirmed that the sources used are correctly quoted and interpreted in the PDD^{/42/}. The use of Excel spreadsheets for the calculation of GHG emissions has been verified by the validation team. The *Prosper Biogas Project CERs Calculation Final Validation Excel spreadsheet*^{/43/} was referred to in the calculation of ER.

It is reasonable to assume that the values applied in the ER calculation are accurate and deemed to be conservative.

Based on the input values, the annual *ex- ante* GHG emissions reduction over the crediting period are estimated to be 24,369tCO₂e per year over a crediting period of 10 years. All estimates of the baseline emissions can be replicated using the data and parameter values provided in the revised PDD.

For ex-post emission reductions, since the baseline scenario applies the option 1(d), in accordance to paragraph 34 of AMS-III.H (version 16) where *the ex-post emission reductions will be the lowest of the following two values:*

- (i.) *The amount of biogas recovered and fuelled or flared (MD_y) during the crediting period, that is monitored ex post;*
- (ii.) *Ex post calculated baseline, project and leakage emissions based on actual monitored data for the project activity.*

3.9 Environmental Impacts

The Malaysian legislation does not require an environmental impact assessment (EIA) for this type of project activity. This was confirmed by the validation team through the review of the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987^{/47/45/} where the project activity is not listed in the list of 'Prescribed Activities'. This was further supported by a letter^{/19/} issued by the Negeri Sembilan's Department of Environment on confirming that the project activity does not require an EIA.

The project will not have any adverse environmental impacts but instead will result in the following environmental benefits:

- reduce volatile organic compounds emissions and odour; and
- promote the improved and modernized of the palm oil production industry.

3.10 Crediting Period

PP had selected a fixed ten-year (10) crediting period starting from 1 January 2013 or on the date of registration of the project activity, whichever is later.

3.11 Comments by Local Stakeholders

A formal consultation process with the local stakeholders was held on 21 November 2011 at the conference room of Prosper Palm Oil Mill, Bandar Seri Jempol, Negeri Sembilan, Malaysia^{/14/}. Invitations to the local stakeholders to the consultation were made through an advertisement in the Star newspaper (English) on 15 November 2011^{/33/}. For local authorities, villages and government agencies, invitations were made through personal invitation letters^{/34/}.

The meeting was attended by 13 participants which included representatives from the state Department of Environment, neighbouring palm oil mills and plantations workers and contractors, and neighbouring villagers. This was evident from the attendance list^{/15/} signed by the participants.

During the consultation process, the participants were briefed on the CDM and the project activity, global warming and the effects of GHG and the benefits of the project in the aspects of environment, social and economic^{/35/}. Apart from the open forum with the participants, the participants' comments were recorded and summarized^{/14/}. PP presented a clear and concise briefing of CDM and its benefits. There were no adverse comments received. Comments received at the meeting were mainly concern about the safety of the biogas in the system. PP responded by providing clarification on the safety feature built into the system. A summary of the comments and response are provided in Section E of the PDD.

From the assessment of the documents provided, it can be concluded that the communication method was appropriate as invitations were made through both public media as well as personal invitations. It was evident that the local stakeholder consultation process had covered the relevant stakeholders and that the stakeholders have been adequately consulted on the proposed CDM project in accordance with the CDM requirements.

In this section, two CLs were raised as follow:

- CL17 was raised asking PP to provide the evidence of invitation to attend the public stakeholders meeting.
- CL18 was raised to correct the error in the table of comments.

Details of the findings and the resolutions are as in Table 3 of Appendix A of this report.

4.0 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

SIRIM QAS Intl. uploaded the first version of the PDD^{/1/} on the UNFCCC's website on 26 January 2012. The PDD was available for comments from 28 January 2012 to 26 February 2012 through the following link^{/28/}.

Comments were received from one of the stakeholder. The responses and resolutions of the comments are as in Appendix B of this report.

5.0 VALIDATION OPINION

SIRIM QAS Intl. performed a validation of the proposed CDM project "Methane recovery and utilization at Prosper Palm Oil Mill, Malaysia" located at Bandar Seri Jempol, Bahau, Negeri Sembilan in Peninsular Malaysia. The GPS coordinates are N 2° 53.356', E 102° 31.331'. The validation was performed on the basis of the UNFCCC criteria for the Clean Development Mechanism and the host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. Using a risk based approach, the review of the project design documentation and the subsequent follow-up interviews provided SIRIM QAS Intl. with sufficient evidence to determine the fulfillment of the stated criteria.

The project participants are Green Lagoon Technology Sdn Bhd of Malaysia, as the host party and Camco Carbon South East Asia Ltd of the United Kingdom of Great Britain and Northern Ireland as the Annex 1 party, meet the requirements to participate in CDM. The LoA issued by the DNA of both Malaysia^{/30/} and the United Kingdom of Great Britain and Northern Ireland^{/21/}. The LoA issued by Malaysia confirmed that the project will assist in achieving sustainable development. The DNAs of both parties have approved the project and have authorized the project participants to request the project to be considered for registration with the UNFCCC.

The project activity involves the installation of new covered anaerobic digesters equipped with methane capture and collection system to replace existing open anaerobic ponds. Methane captured from anaerobic digester system will be used as fuel in the gas engine and the existing boiler. An enclosed flare system will be installed to combust any excess biogas that cannot be utilized in the boiler. However, the scope of biogas utilization will not be included in the project activity and was not considered in the emission reduction calculation. The project will result in the reduction of greenhouse gas emissions that are real, measurable and give long term benefits to the mitigation of climate change.

The project applies AMS-III.H "Methane recovery in waste water treatment" (version 16). The demonstration of the applicability of the methodology and the determination of the baseline was justified. It was demonstrated that the project is not likely the baseline scenario. Emission reductions from the project are hence additional to any that would occur in the absence of the project activity.

The project will result in the reduction of GHG emissions that is real, measurable and gives long-term benefits and that are additional to what would have occurred in the absence of the project. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions as specified in the final version of PDD. The total emission reductions from the project are estimated to be 243,690tCO₂e over the selected 10 years fixed crediting period. The proposed CDM project is eligible as a type III small-scale CDM project activity as the emission reductions is below 60 ktCO₂e per year.

The monitoring plan is in line with the approved monitoring methodology AMS-III.H "Methane recovery in waste water treatment" (version 16). The plan adequately addresses all necessary information for monitoring and reporting of emissions reductions due to the project activity. Responsibilities and authorities for project management, monitoring and reporting, and the data quality control and quality assurance procedures have been described in the PDD. These

procedures will be implemented before the start of the crediting period.

There is no requirement for an EIA by the host country. The project is not likely to create any significant adverse environmental impacts. The project complies with the applicable environmental regulations in Malaysia.

In summary, it is the opinion of SIRIM QAS International's that the proposed project "Methane recovery and utilization at Prosper Palm Oil Mill, Malaysia", as described in the PDD, version 3.4, dated 24 December 2012^{42/}, meets all relevant UNFCCC requirements for the CDM, and correctly applies the approved methodology AMS-III.H. "Methane recovery in wastewater treatment" (version 16). As such, SIRIM QAS Intl. recommends the registration of the project as a CDM project activity.

Prepared by :



(Syed Anuar Shah Syed Mansor)
Validation Team Leader

Approved by:



(Parama Iswara Subramaniam)
DOE Representative

6.0 REFERENCES

Information Reference List

Ref. No.	Document or Type of Information
/1/	PDD (version 1), 19 January 2012
/2/	AMS-III.H (version 16), Methane recovery in wastewater treatment
/3/	Project emissions from flaring (version 2.0.0, EB 68, Annex 15).
/4/	Tool to calculate baseline, project and/or leakage emissions from electricity consumption (version 1), EB41
/5/	Non-binding best practice examples to demonstrate additionality for SSC project activities, EB35 Annex 34
/6/	Prosper Biogas Project CERs Calculation Final Validation Excel sheet
/7/	Prosper_FA_Version_5 Final Validation Excel sheet
/8/	Contract agreement between Prosper Palm Oil Mill Sdn Bhd and Green Lagoon Technology Sdn Bhd, TNA/TLE/MA-004/10/GLTSB-PPOM, 5 May 2011
/9/	Industrial Processes & The Environment (Handbook No.3), Crude Palm Oil Industry, Department of Environment
/10/	Prosper Palm Oil Mill Feasibility Study for Covered Lagoon System, 27 April 2011
/11/	Letter of Submission of Prior Consideration Form to Ministry of Natural Resources and Environment, 12 September 2011
/12/	Email of Submission of Prior Consideration Form for CDM Project
/13/	Purchase Order to Sunbes Specialist Services Sdn Bhd, P.O.No:GLT002-PO-001, 28 November 2011
/14/	CDM Stakeholders Forum Questionnaire Summary Report
/15/	Stakeholders meeting attendance list
/16/	Written approval for the installation of biogas flare stack from Department of Environment Negeri Sembilan, 14 December 2011
/17/	Written approval for the upgrading of the POME effluent treatment from Department of Environment Negeri Sembilan, 18 July 2011
/18/	Modalities of Communication
/19/	Letter of exemption to carry out Environmental Impact Assessment from Department of Environment Negeri Sembilan, 10 November 2011
/20/	Application to extend the period for desludging works from Department of Environment Negeri Sembilan, 6 May 2011
/21/	Letter of Approval from DNA of United Kingdom of Great Britain and Northern Ireland
/22/	Anaerobic ponds cleaning works completion report to Department of Environment Negeri Sembilan, 6 September 2011
/23/	Letter of estate owners regarding the land application of treated POME to Seriting Hilir 2 Plantation Block 2, 20 August 2011
/24/	Shengdong biogas engine product description
/25/	Action and Monitoring list for Prosper palm Oil Mill Digester construction work
/26/	Design engineering drawings for the proposed construction of two bio-digesters for Prosper Palm Oil Mill
/27/	'Guidelines on the demonstration of additionality of small-scale project activities' (version 09.0)
/28/	http://cdm.unfccc.int/Projects/Validation/DB/11XFHOTWXP904YMK1T7ATTMJNQZUH/view.html
/29/	ERPA between Green Lagoon Technology Sdn Bhd and Camco South East Asia Ltd, 30 May 2012
/30/	Letter of Approval from DNA of Malaysia
/31/	Product description for Hofstetter biogas flare
/32/	Ponds layout drawing for the new project effluent treatment system
/33/	Newspaper cutting for the public stakeholder meeting announcement
/34/	Invitation letter to the Department of Environment for the public stakeholder meeting

/35/	Local stakeholders meeting presentation
/36/	www.asiabiogas.com/cigar.html on COD removal efficiency
/37/	Permulab Sdn Bhd test certificates on effluent sampling during measurement campaign
/38/	Summary of COD effluent sample result during measurement campaign
/39/	GSE Technical Note on HDPE lifespan
/40/	Rated power for auxiliary equipment
/41/	10 years FFB processing rate forecast
/42/	PDD, version 3.4, 24 December 2012
/43/	Prosper Biogas Project CERs Calculation Final Validation Version 3.3
/44/	Prosper_FA_Version_5 Final Validation Version 3.3
/45/	Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987
/46/	http://www.bbc.co.uk/weather/world/city_guides/
/47/	http://www.doe.gov.my/portal/legislation-actsregulation-order/
/48/	'Guidelines on the demonstration and assessment of prior consideration of the CDM', EB 62 Annex 13
/49/	http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html
/50/	Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations 1977
/51/	OPEX Calculation for Palm Oil Mill Effluent Sites in Peninsular Malaysia

APPENDIX A
VALIDATION PROTOCOL
Project No. SQAS-CDM-EG03550001

Table 1 Mandatory Requirements for Small Scale Clean Development Mechanism (CDM) Project Activities

REQUIREMENT	REFERENCE	COMMENT	CONCLUSION
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	CAR1 OK	The Annex 1 Party is yet to be determined.
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a VVM para 45 & 126	CAR2 OK	The host country (non-Annex 1 Party) is Malaysia. Confirmation by the host country is yet to be obtained.
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2. VVM para 45	CAR2 OK	Confirmation from non-Annex 1 Party (host country) is yet to be obtained.
4. The project shall have written approval of voluntary participation from the designated national authorities of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a VVM para 53	CAR1/CAR2 OK	The written approvals of voluntary participation from both DNA Parties are yet to be obtained.
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	The project will contribute to GHG emission reductions by capturing and utilizing the methane that would have been emitted to the environment from the series of open lagoon treatment system by combusting the methane in the gas engine for electricity generation and in the boiler for heat generation. These the emission reductions will be real, measurable and give long-term benefits.

REQUIREMENT	REFERENCE	COMMENT	CONCLUSION
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	Refer to Section B.2.1 of this protocol. The project proponent has demonstrated that the project activity would not have occurred without the CDM benefits. From the discussion in section B.2.1 of this protocol, project is additional due to the investment barriers.
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Marrakech Accords (Decision 17/CP.7) VVM para 47	OK	No public funding for this project activity as stated in section A.4.4 and Annex 2 of the PDD.
8. Parties participating in the CDM shall designate a national authority for the CDM	Marrakesh Accords (CDM modalities§ 29) VVM para 45	CAR4 OK	DNA of non-Annex 1 Party (host): Ministry of Natural Resources and Environment The Annex 1 Party is yet to be determined.
9. The host country shall be a Party to the Kyoto Protocol	Marrakesh Accords (CDM modalities§ 30) VVM para 45	OK	Malaysia ratified to Kyoto Protocol on September 4, 2002. Refer http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php
10. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	The proposed project activity meets the eligibility criteria for small scale CDM project activities where the estimated average emission reductions is 27,342tCO ₂ e. It was confirmed that the project is not a debundled component of a larger scale project activity.
11. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e VVM para 60	OK	Yes, the proposed project activity confirmed to Type (III) other project activities. Yes, the selected baseline methodology is AMS-III.H (version

REQUIREMENT	REFERENCE	COMMENT	CONCLUSION
			16) 'methane recovery in wastewater treatment'.
12. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d VVM para 40, 41 & 42	OK	The PDD was uploaded on 26 January 2012. The global stakeholder process was from 28 January 2012 to 26 February 2012. There were comments received for this project from one stakeholder. Details were discussed in Appendix B of this protocol.

Table 2 Requirements Checklist

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. Project Description					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	VVM para 136 (a)	DR	Yes, the project qualifies as a small scale CDM activity. <i>To discuss further at site.</i>		
		SV/I	By definition of paragraph 6(c) of decision 17/CP.7 on the modalities and procedures for the CDM, for <i>-Type III: other project activities, category M: methane recovery'.</i> The project is an installation of sealed HDPE covers over 2 open existing anaerobic lagoons to recover methane from palm oil mill effluent. The generated methane gas will be used as RE for electricity and steam generation. The project is expected to reduce on average of 27,342tCO ₂ e/yr which is less than 60,000tCO ₂ e/yr limit for a small scale CDM project activity.	OK	OK
A.1.2. Does proposed project activity conform to one of the project categories defined for small scale CDM project activities?	VVM para 136 (b)	DR	Yes, the proposed project activity meets the definition for defined for small scale CDM project activities, <i>-Type III: other project activities: methane recovery in wastewater treatment.</i>	OK	OK
A.1.3. The small scale project activity is not a debundled component of a larger project activity?	VVM para 136 (c)	DR	<i>To verify at site.</i>		
		SV/I	It was verified at site and through browsing the UNFCCC website that there are no similar projects implemented by the same project proponent with the same technology within 1 km of the project location registered within the previous 2 years. It was agreed that the project activity is not a debundled component of a larger project activity.	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.1.4. Is an analysis of the environmental impacts of the project activity required by the host country?	VVM para 136 (d)	DR	An analysis of the environmental impacts of the project activity is not required by the host country.	OK	OK
A.2. Project Design & Project Description					
A.2.1. Is the PDD in accordance with the applicable CDM requirements for completing the PDD?	VVM para 56	DR	It has been reviewed that the PDD for the project activity has been documented in accordance to the 'Guidelines for Completing the Simplified Project Design Document (CDM-SSC-PDD)' version 3. .	OK	OK
A.2.2. Is the description of the proposed CDM project activity as contained in the PDD sufficiently cover all relevant elements, accurate and provides the reader with a clear understanding of the nature of the proposed CDM project activity.	VVM para 59	SV/I	<p>The project activity will include the covering of the two existing anaerobic lagoons with synthetic high-density polyethylene (HDPE) lining which can create an in-ground anaerobic reactor system. It is sealed by means of strip-to-strip welding. A peripheral anchor trench is dug around the perimeter of the existing lagoons as a mean of securing the membrane. The in-ground anaerobic reactor system is fitted with multiple inlet pipes at the bottom of the lagoon where the untreated POME is fed. Several sludge removal pipes will also be installed in the covered lagoon system to allow for sludge removal in the event of sludge build-up in the system. The treated POME from the covered lagoons will continue to flow through the entire existing lagoons system (as in baseline) to ensure the discharge meets the requirements of the legal.</p> <p>The recovered biogas will be used as a source of renewable energy to generate electricity and/or heat for mill use. However, the utilization of biogas for renewable energy is not part of the CDM project activity, therefore, credits from renewable energy generation component will not claimed. Excess biogas will be flared in an enclosed flare system.</p> <p>PP however has yet to submit supporting documents for the project activity.</p>	OK	OK
A.2.3. The description in the PDD reflects the proposed CDM project activity for the following types of CDM	VVM para	DR	It is confirmed that the project is a small scale CDM project activity.	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
project activities unless other means are specified in the methodology a) Large scale projects; b) Non-bundled small scale projects with emission reductions exceeding 15,000 tonnes per year; c) Bundled small scale projects, each with emission reductions not exceeding 15,000 tonnes per year; in such case the number of physical site visits may however be based on sampling, if the sampling size is appropriately justified through statistical analysis.	60		Visit to the project activity site was carried out on 28-29 February 2012.		
A.2.4. For other individual proposed small scale CDM project activities with emission reductions not exceeding 15,000 tonnes per year, was a physical site inspection conducted?	VVM para 61	DR	Not applicable since the expected ER for the project activity is more than 15,000tCO ₂ e/yr.	OK	OK
A.2.5. For all other proposed CDM project activities not referred to in paragraphs 59 – 61, was a physical site inspection conducted? And justify if a physical site inspection is not undertaken.	VVM para 62	DR	Not applicable.	OK	OK
A.2.6. Is the proposed CDM project activity involves the alteration of an existing installation or process? If yes, project description clearly states the differences resulting from the project activity compared to the pre-project situation?	VVM para 63	SV/I	Biogas burner will be installed at the existing biomass boiler. However, it is not part of the project activity.	OK	OK
B. Baseline and monitoring methodology					
B.1. Applicability of the selected methodology to the project activity					
B.1.1. Is the methodology correctly quoted and applied, and consistent with the actual text of the applicable version of the methodology available on the UNFCCC CDM website.	VVM para 70	DR	Yes, the selected baseline methodologies are in line with the baseline methodology provided for the project category. The selected baseline methodology is - AMS-III.H (version 16) 'Methane recovery in wastewater treatment'.	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.1.2. Have the project participants shown that the project activity meets each of the applicability conditions of the approved methodology or any tool or other methodology component referred to therein?.	VVM para 71	DR	<i>To discuss further at site.</i>		
		SV/I	PP has justified the applicability of the baseline methodology to the project being considered in section B.2 of the PDD where, 1)It is agreed that the project activity is in line with option 1(d) where the project will introduce the recovery and combustion of biogas to an existing anaerobic wastewater treatment system. 2)It is agreed that the existing 5 anaerobic lagoons meet the definition of anaerobic system where the pond has to be more than 2 meter deep, without aeration and the ambient temperature of above 15°C; and sludge removal interval no less than 30 days.	OK	OK
			PP to submit supporting document(s) or reference(s) related to the depth of the ponds and ambient temperature.	CL2	OK
			PP is to provide the previous desludging records and evident that the sludge is being land applied. 3)The recovered biogas will be combusted in gas engine for electricity generation and any excess of biogas will be combusted in existing biomass boiler. It is agreed that the project activity fulfills paragraph 3(a). However, the utilization of biogas as RE for electricity and thermal generation will not be claimed under this CDM project. 4)It is agreed that paragraphs 5 to 11 of the AMS-III.H are not applicable to the project activity. 5)It is agreed that this is not a Greenfield project and the project activities do not resulting in capacity addition of the wastewater treatment system. 5)The location of the wastewater treatment plant as well as the source generating the wastewater has been defined in the PDD. 6)Based on the PDD, the estimated average emission reductions for the Type III components of the project activity is 27,342tCO ₂ e/yr which is less than the 60,000 tCO ₂ e/yr.	CL15	OK
			As for the project lifetime, PP is requested to provide supporting document(s) for major equipment i.e. the ponds cover system to validate lifetime of the project activity.	CL5	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.1.3. Has the choice of methodology justified in the PDD and the each applicability conditions of the methodology or tool being justified? (cross check the PDD against the other sources to confirm that the project activity meets the applicability conditions of the methodology)	VVM para 71	SV/I	<p>The choice of methodologies and each applicability conditions of the methodology have been justified in the PDD. The validation team has verified the justification by</p> <ul style="list-style-type: none"> -visiting to the project site and existing open ponds, mill and biomass processing plant, -reviewing the drawings and specifications of project activity, -interviewing the Mill Manager, -reviewing the letter of application to relevant authority, -reviewing the electricity bills, and -reviewing the contract agreement for the development of the project. 	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.2. Project boundary					
B.2.1. Has the PDD correctly describe the project boundary, including the physical delineation of the proposed CDM project activity included within the project boundary for the purpose of calculating project and baseline emissions for the proposed CDM project activity?	VVM para 78	DR	Yes, the project's spatial boundaries are defined in Section A.4.1.4 of the PDD. <i>To verify at site.</i>		
		SV/I	The project site address as stated below has been confirmed to be accurate. Batu 15, Lebuhraya Bahau-Keratong, Bandar Seri Jempol, Bahau, Negeri Sembilan, Malaysia The GPS coordinates for the project site are given as N 2° 53.356' and E 102° 31.331'. The coordinates were checked using Google Maps website and handheld GPS tracker. The given GPS coordinates are agreed to be accurate to represent the location of the project. The project boundary for the project activity covers all facilities affected by the project activity including processing, transportation and application or disposal of waste products as well as biogas takes place. It covers the wastewater treatment system in baseline and project; and sludge treatment is not in the project boundary as the sludge treatment is the same in baseline and project.	OK	OK
B.2.2. Are all sources and GHGs required by the methodology have been included within the project boundary?	VVM para 79	DR	Table B.3 of the PDD addresses sources and GHGs within the project boundary. However it is confirmed that sources and GHGs are not specified in both methodologies used. It was noted that PP had excluded CO ₂ as a possible source of emission but the justification provided was not wholly accurate as it was indicated that only renewable sources are used for power generation.	CL9	OK
B.3. Baseline Identification					
B.3.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing	VVM para 81	SV/I	It is agreed that the project activity is not a likely baseline scenario due to investment barriers.	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
practice or other barriers?					
B.3.2. Is selected methodology requires use of tools to establish the baseline scenario? If yes, has the application of the tools been followed?	VVM para 82	DR	There are no Tools required by the methodologies to establish the baseline scenario.	OK	OK
B.3.3. If the methodology requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario, has it been determined based on financial expertise and local and sectoral knowledge, determine whether all scenarios that are considered by the project participants and are supplementary to those required by the methodology, are reasonable in the context of the proposed CDM project activity and that no reasonable alternative scenario has been excluded.	VVM para 83	DR	The methodology do not require several alternative scenarios to be considered in the identification of the most reasonable baseline scenario.	OK	OK
B.3.4. Are the documents and sources referred to in the PDD are correctly quoted and interpreted?. Has a cross check of the information provided in the PDD with other verifiable and credible sources, such as local expert opinion, if available been carried out?	VVM para 84	DR	<i>To discuss further at site.</i>		
		SV/I	The baseline is based on measurement campaign in 27 October to 10 November 2011 to determine COD values and past five years (2007-2011) historical data of FFB processed to determine the volume of POME. References and website links made in the PDD have been checked and the sources confirmed to be correctly quoted and interpreted. Information has been crosschecked with publicly available sources.	OK	OK
B.3.5. Are relevant national and/or sectoral policies and circumstances taken into account?	VVM para 85	DR	<i>To discuss further at site.</i>		
		SV/I	Relevant national and sectoral policies and circumstances have been taken into account. The final discharge of wastewater treatment system has to comply with written approval issued by the Department of Environment. PP has received written approval to discharge the treated wastewater to nearby plantation.	OK	OK
B.3.6. Has the PDD provides a verifiable description of the	VVM	DR	<i>To discuss further at site.</i>		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM project activity?	para 86	SV/I	In the absence of the CDM project activity, the PP will continue the business-as-usual of treating the POME in the series of open anaerobic ponds without methane recovery.	OK	OK
B.4. Algorithms and/or formulae used to determine emission reductions					
B.4.1. Determine whether the equations and parameters in the PDD have been correctly applied by comparing them to those in the selected approved methodology. If the methodology provides for selection between different options for equations or parameters, the validation team shall confirm that adequate justification has been provided (based on the choice of the baseline scenario, context of the proposed CDM project activity and other evidence provided) and that the correct equations and parameters have been used, in accordance with the methodology selected.	VVM para 90	DR	<i>To discuss further at site.</i>		
		SV/I	<p><u>Baseline emissions</u> For methane recovery, it was identified as per paragraph 18 of AMS-III.H (version 16).</p> <p>PP has identified, i)baseline emissions of the wastewater treatment systems affected by the project activity ($BE_{ww,treatment,y}$), and ii)baseline methane emissions from degradable organic carbon in treated wastewater discharged into sea/river/lake ($BE_{ww,discharge,y}$) as applicable to the project activity.</p> <p>PP has provided justification on why the other baseline emissions are not applicable to the project activity. The justification is accepted where i)baseline emissions from electricity or fossil fuel consumption ($BE_{power,y}$) because electricity is supplied by renewable biomass source, ii)baseline emissions of the sludge treatment systems affected by the project activity ($BE_{s,treatment,y}$) because in baseline is a wastewater treatment system and not a sludge treatment system, and iii)baseline methane emissions from anaerobic decay of the final sludge produced ($BE_{s,final,y}$) because in baseline the sludge is used in soil application.</p> <p>The validation team has reviewed the baseline emissions equations in the PDD and ER spreadsheet. The equations are agreed to be correct and in accordance with the methodology.</p>	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>The calculations for the baseline emissions are documented in a complete and transparent, except for the lapses observed below,</p> <ul style="list-style-type: none"> -minor errors were observed in formula used in baseline emission calculation, annotation used and in the efficiency of the digester system. -the detail description as per calculations provided in the Excel sheet, was deemed inappropriate and unjustified for $BE_{s,treatment,y}$ and $BE_{s,final,y}$. PP to revise descriptions accordingly. <p>The description on “Biogas Engine Plant” in ER spreadsheet was found to be too broad and unjustified. PP to provide further details in terms of the equipment to be used in the “Biogas Engine Plant” and their respective rated capacities. Also, PP to provide supporting documents for all equipment to be used in the project activity.</p> <p><u>Project emissions</u> For methane recovery, it was identified as per paragraph 29 of AMS-III.H.</p> <p>PP has identified,</p> <ul style="list-style-type: none"> i)CO₂ emissions from electricity and fuel used by the project activities ($PE_{power,y}$), ii)methane emissions from wastewater treatment systems affected by the project activity, not equipped with biogas recovery in the project scenario ($PE_{ww,treatment,y}$) ii)methane emissions on account of inefficiency of the project activity wastewater treatment systems and presence of degradable organic carbon in treated wastewater ($PE_{ww,discharge,y}$), iii)methane fugitive emissions due to inefficiencies in capture systems ($PE_{fugitive,y}$), and iv)methane emissions due to incomplete flaring ($PE_{flaring,y}$), as applicable in the project activity. <p>PP has provided justification on why the other project emissions are not applicable to the project activity. The</p>	<p>CL12</p> <p>OK</p> <p>CL13</p> <p>OK</p> <p>CL14</p> <p>OK</p> <p>OK</p> <p>OK</p>	<p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p>

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>justification is accepted where</p> <p>i) methane emissions from sludge treatment systems affected by the project activity, and not equipped with biogas recovery in the project situation ($PE_{s,treatment,y}$) because the project is not a methane recovery from sludge treatment system,</p> <p>ii) methane emissions from the decay of the final sludge generated by the project activity treatment systems ($PE_{s,final,y}$) because the final sludge will be used for land application in aerobic conditions. The disposal will be monitored ex post.</p> <p>iii) methane emissions from biomass stored under anaerobic conditions which would not have occurred in the baseline situation ($PE_{biomass,y}$) because there will not be any biomass stored as a result of the project activity.</p> <p>The validation team has reviewed the project emissions equations in the PDD and ER spreadsheet. The equations are agreed to be correct and in accordance with the methodologies.</p> <p>Therefore, project emissions applicable for the project activity are $PE_y = PE_{power,y} + PE_{ww,treatment,y} + PE_{ww,discharge,y} + PE_{fugitive,y} + PE_{flaring,y}$</p> <p>For $PE_{power,y}$, clarification is required power rating for equipment in project, TDL and EF values and the kWh unit conversion factor.</p> <p>PP to correct the $B_{o,ww}$ and MCF values for $PE_{ww,treatment,y}$, $PE_{ww,discharge,y}$ and $PE_{fugitive,y}$ used in the ER calculations. For $PE_{flaring,y}$, although the equation used is correct, however there are parameters and annotation that need to be corrected.</p> <p>It was found that the application of the uncertainty factor of 0.89 was on the COD values not the COD removal efficiency. PP to submit COD campaign results and revise the findings accordingly.</p> <p>The detail description as per calculations provided in the Excel</p>	<p>GL10</p> <p>GL11</p> <p>GL16</p> <p>GL13</p>	<p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p>

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			sheet, was deemed inappropriate and unjustified for $PE_{s,treatment,y}$ and $PE_{s,final,y}$. PP to revise descriptions accordingly. <u>Leakage</u> It was confirmed that there are no energy generating equipment being transferred from another facility. Therefore, $LE_v=0$.	OK	OK
B.4.2. Verify the justification given in the PDD for the choice of data and parameters used in the equations.	VVM para 91	SV/I	The justification given in the PDD for the choice of data and parameters used in the equations has been verified.	OK	OK
B.4.3. If data and parameters will not be monitored throughout the crediting period of the proposed CDM project activity but have already been determined and will remain fixed throughout the crediting period, validation team shall assess all data sources and assumptions are appropriate and calculations are correct, applicable to the proposed project activity and will result in a conservative estimate of emission reductions.	VVM para 91	SV/I	The validation team has reviewed the parameters that will remain fixed throughout the crediting period. No electricity in baseline <ul style="list-style-type: none"> COD of wastewater inflow to and out from baseline wastewater treatment system were based on 11-day measurement campaign which was carried out from 27 October to 10 November 2011. COD removal efficiency of baseline wastewater treatment system i ($\eta_{COD,BL,i}$) was also based on 11-day measurement campaign was carried out from 27 October to 10 November 2011 Methane correction factor for discharge pathways in baseline wastewater treatment system were based on default value as specified in Table III.H.1 of AMS-III.H version 16. The electricity consumed in the proposed project activity was based on the rated power rating of the equipment expected to be used in project activity. It is agreed that the sources and assumptions in the calculations are appropriate, correct and applicable to the proposed project activity.	OK	OK
B.4.4. If data and parameters will be monitored on implementation and hence become available only after validation of the project activity, the validation team shall confirm that the estimates provided in the	VVM para 91		The volume of POME was based on the historical amount of FFB processed for year 2007 to 2011. $PE_{flaring}$ was based on $BE_{ww,treatment}$ without the GWP_{CH_4} factor. This is in accordance to methodology AMS-III.H version 16.	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
PDD for these data and parameters are reasonable.					
B.5. Additionality of a project activity					
B.5.1. Has the PDD describe how the proposed CDM project activity is additional?	VVM Para 94	DR	The PDD has described how the proposed CDM project activity is additional in section B.5.	OK	OK
B.5.2. Has the PP provide reliable, credible data, rationales, assumptions, justifications and documentation in the PDD to support the demonstration of additionality?	VVM Para 95	DR	PP has provided reliable, credible data, rationales, assumptions, justifications and documentation in the PDD to support the demonstration of additionality. It has been provided in a form of footnotes in the PDD. PP has also provided supporting evidences in a form hard copy.	OK	OK
B.5.3. The validation team shall consider tools and documents provided by the CDM Executive Board to demonstrate the additionality of proposed CDM project activities, as well as specific complementary or alternative requirements included in approved CDM methodology.	VVM para 96	DR	Reference is made to the ' <i>Attachment A of Appendix B Simplified Modalities and Procedures for Small-Scale CDM Project Activities</i> '.	OK	OK
B.5.4. Prior consideration of the clean development mechanism					
B.5.4.1. Is the start date of the project activity reported in the PDD in accordance with the Glossary of CDM terms?	VVM Para 99	DR	The starting date of project activity is stated as 28 November 2011. It was based on the purchase order issuance date for key equipment	OK	OK
B.5.4.2. Determine whether it is a new project activity (a project activity with a start date on or after 02 August 2008) or an existing project activity (a project activity with a start date before 02 August 2008).	VVM para 100	SV/I	The project is classified as a new project activity since the start date of the project activity is after the 2 August 2008 date.	OK	OK
B.5.4.3. In case of new project activity has the PP provided the following: <ul style="list-style-type: none"> informed the host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status? has such a notification been provided by the 	VVM para 101	SV/I	The project participant has informed the UNFCCC Secretariat of their intentions to seek for CDM status. The Prior Consideration Form was submitted to the Secretariat on 19 September 2011 and to host party DNA on 17 September 2011.	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
project participants within six months of the project activity start date?					
<p>B.5.4.4. For an existing project activity, for which the start date is prior to the date of publication of the PDD for GSCP, the validation team shall assess the PP's prior consideration of the CDM through document reviews and shall satisfy following requirements:</p> <p>a) Evidence that must indicate that awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project. Evidence to support this would include, inter alia, minutes and/or notes related to the consideration of the decision by the Board of Directors, or equivalent of the PP, to undertake the project as a proposed CDM project activity..</p> <p>b) reliable evidence (Evidence to support this should include, inter alia, contracts with consultants for CDM/PDD/methodology services, Emission Reduction Purchase Agreements or other documentation related to the sale of the potential CERs (including correspondence with multilateral financial institutions or carbon funds), evidence of agreements or negotiations with a DOE for validation services, submission of a new methodology to the CDM Executive Board, publication in newspaper, interviews with DNA, earlier correspondence on the project with the DNA or the UNFCCC secretariat.</p>	VVM para 102	DR	Not applicable	OK	OK
B.5.5. Identification of alternatives					

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
<p>B.5.5.1. Has the PDD included list of alternatives and ensure that the following are addressed:</p> <ul style="list-style-type: none"> • The list of alternatives includes as one of the options that the project activity is undertaken without being registered as a proposed CDM project activity; • The list contains all plausible alternatives that the DOE, on the basis of its local and sectoral knowledge, considers to be viable means of supplying the outputs or services that are to be supplied by the proposed CDM project activity; • The alternatives comply with all applicable and enforced legislation. 	VVM para 106	DR	Not applicable since alternative scenarios assessment is not required by the methodology AMS-III.H.	OK	OK
B.5.6. Investment Analysis					
<p>B.5.6.1. If investment analysis has been used to demonstrate the additionality of the proposed CDM project activity, the PDD shall provide evidence that the project proposed CDM project activity would not be:</p> <ul style="list-style-type: none"> • The most economically or financially attractive alternative; or • Economically or financially feasible 	VVM para 108	DR	Investment analysis is used to demonstrate additionality of the proposed project activity. Simple cost analysis is applied to determine that the proposed project activity is not economically or financially attractive.	OK	OK
<p>B.5.6.2. Has the PP demonstrate the investment analysis using the following approaches:</p> <p>a) The proposed CDM project activity would produce no financial or economic benefits other than CDM-related income and document the costs associated with the proposed CDM project activity and the alternatives identified and demonstrate that there is at least one alternative which is less costly than the proposed CDM project activity;</p>	VVM para 109	DR			

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
<p>c) The proposed CDM project activity is less economically or financially attractive than at least one other credible and realistic alternative;</p> <p>d) The financial returns of the proposed CDM project activity would be insufficient to justify the required investment</p>			From the analysis, it is agreed that the proposed project activity is less economically or financially attractive than at least one other credible and realistic alternative	OK	OK
B.5.6.3. Has the PP's apply the latest version of the Guidance on the Assessment of Investment Analysis as provided by the CDM Executive Board and with other relevant guidance including the latest guidelines on plant load factors guidelines for the reporting and validation of plant load factors in the PDD?	VVM Para 110	DR	PP has made reference to the 'Non-binding best practice examples to demonstrate additionality for SSC project activities' EB 35 Annex 34 and applied simple cost analysis where CDM is the only revenue stream.	OK	OK
B.5.6.4. Has PP provide authentic, accurate and suitable sources for all parameters and assumptions used in calculating the relevant financial indicator?	VVM Para 111 (a)	DR	<p>In simple cost analysis, the cost of the proposed project activity is compared against the baseline scenario. It is confirmed that there is cost incurred in maintaining the business as usual as in baseline scenario. However in implementing the proposed project activity, there are cost required for capital expenditure (CAPEX) and operational expenditure (OPEX). The % for the OPEX was based on the commonly accepted value practice in the region. The validation team has verified the parameters for CAPEX and OPEX and agreed that they are accurate and appropriate.</p> <p>PP is to provide evident regarding the capital expenditure for the project activity.</p> <p>PP is to provide supporting evident for the values used in the financial analysis calculation.</p>	<p>OK</p> <p>CL3</p> <p>CL4</p>	<p>OK</p> <p>OK</p> <p>OK</p>
B.5.6.5. The validation team shall cross-check the parameters against third-party or publicly available sources, such as invoices or price indices.	VVM Para 111 (b)	DR	The validation team has cross-checked the parameters values against the contract documents, invoices and registered PDDs.	OK	OK
B.5.6.6. The validation team shall review feasibility reports, public announcement and annual financial reports related to the proposed CDM project activity and the project participants.	VVM Para 111 (c)	DR	The validation team has reviewed the feasibility study report related to the proposed project activity. It was agreed that the capital expenditure for the project activity was based on the report.	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.5.6.7. Assess the correctness of computations carried out and documented by the PP.	VVM para 111 (d)	DR	Detailed calculation for project IRR is provided in the Excel spreadsheet. The validation team has reviewed the calculation. The input values to the analysis are valid and appropriate.	OK	OK
B.5.6.8. Has PP carried out the sensitivity analysis to determine what conditions variations in the result would occur, and the likelihood of these conditions?	VVM para 111 (e)	DR	Sensitivity analysis is not applied in the investment analysis.	OK	OK
B.5.6.9. Is the type of benchmark applied suitable for the type of financial indicator presented?	VVM para 112 (a)	DR	Benchmark is not applied for this simple cost analysis.	OK	OK
B.5.6.10. Is the risk premiums applied in determining the benchmark reflect the risks associated with the project type or activity?	VVM para 112 (b)	DR	Risk premiums is not applied in determining the benchmark.	OK	OK
B.5.6.11. Determine whether it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, assessing previous investment decisions by the project participants involved and determining whether the same benchmark has been applied or if there are verifiable circumstances that have led to a change in the benchmark.	VVM para 112 (c)	DR	Not applicable.	OK	OK
B.5.6.12. In cases where the PP rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed CDM project activity, please ensure that : a) The FSR has been the basis of the decision to proceed with the investment in the project, i.e. that the period of time between the finalization of the FSR and the investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the	VVM para 113	DR	The values from the Feasibility Study Reports (FSR) for proposed CDM project activity are not required to be approved by the national authority. It is agreed that the basis of the decision to proceed with investment in the project was based on the FSR.	OK OK	OK OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
underlying project activity that the input values would have materially changed;					
b) The values used in the PDD and associated annexes are fully consistent with the FSR, and where inconsistencies occur the DOE should validate the appropriateness of the values;			The validation team has agreed that the values used in the PDD and associated annexes are fully consistent with the FSR.	OK	OK
c) On the basis of its specific local and sectoral expertise, confirmation is provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision.			It is agreed that the input values from the FSR are valid and applicable at the time of the investment decision.	OK	OK
B.5.7. Barrier analysis					
B.5.7.1. Does the proposed CDM project activity faces barriers that a) Prevent the implementation of this type of proposed CDM project activity; b) Do not prevent the implementation of at least one of the alternatives.	VVM para 115	DR	The proposed project activity faces barriers that prevent the implementation of the CDM project activity.	OK	OK
B.5.7.2. Issues that have a clear direct impact on the financial returns of the project activity cannot be considered barriers and shall be assessed by investment analysis. This does not refer to either: a) Risk related barriers, for example risk of technical failure, that could have negative effects on financial performance; or b) Barriers related to the unavailability of sources of finance for the project activity	VVM para 116	SV/I	As stated in Section B.5 of the PDD, the project activity would not have occurred without the CDM due to the investment barriers.	OK	OK
B.5.7.3. Has the PDD provide the evidence to determine whether the barriers listed in the PDD are real	VVM para	DR	The barrier identified is only investment barrier.	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
and whether it is assessed by means of available evidence and/or interviews with relevant individuals (including members of industry associations, government officials or local experts if necessary) that the barriers listed in the PDD exist?	117 (a)				
B.5.7.4. Are the existence of barriers substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics?	VVM Para 117 (a)	DR	No other barriers except investment barrier identified for the proposed project activity.	OK	OK
B.5.7.5. Determine whether the barriers prevent the implementation of the project activity but not the implementation of at least one of the possible alternatives	VVM para 117 (b)	SV/I	From the investment barrier, the barrier prevents the implementation of the proposed project activity but not the baseline scenario of the business as usual.	OK	OK
B.5.8. Common practice analysis					
B.5.8.1. Assess whether the geographical scope (e.g. the defined region) of the common practice analysis is appropriate for the assessment of common practice related to the project activity's technology or industry type. For certain technologies the relevant region for assessment will be local and for others it may be transnational/global. If a region other than the entire host country is chosen. Please explain why this region is appropriate.	VVM para 120 (a)		The assessment of barriers due to prevailing practice is not assessed.	OK	OK
B.5.8.2. Using official sources and local and industry expertise, determine to what extent similar and operational projects (e.g. using similar technology or practice), other than CDM project activities, have been undertaken in the defined region;	VVM Para 120 (b)		As above.	OK	OK
B.5.8.3. If similar and operational projects, other than CDM project activities, are already widely observed and commonly carried out in the defined region, assessed whether there are	VVM Para 120		As above.	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
monitoring plan are feasible within the project design?	para 123 (b)		are feasible within the project design, except for The monitoring of methane concentration where only one measurement point is stated in the PDD.	CL7	OK
C.1.5. Are the means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified.	VVM para 123 (b)	SV/I	The means of implementation of the monitoring plan are sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified. As stated in section B.7.1 and B.7.2 of the PDD, the project emissions data will be archived until 2 years after the last crediting period. PP to rectify the calibration procedures to be in line with the 'General Guidelines to SSC CDM methodologies' for parameters POME flowmeter and biogas flowmeters.	OK CL6	OK OK
D. Local stakeholder consultation					
D.1.1. Have relevant stakeholders been consulted?	VVM Para 128	SV/I	Relevant stakeholders have been consulted. Representatives from regulatory bodies, local council, villagers, estates have been invited. The invitation to this local stakeholders meeting was advertised in The Star newspaper. PP to submit copies of the newspaper announcement, invitation letters, presentation materials and attendance list.	OK CL17	OK OK
D.1.2. Have comments by local stakeholders that can reasonably be considered relevant for the proposed CDM project activity, have been invited?	VVM para 129 (a)	DR	As stated in section E of the PDD, comments from local stakeholders have been invited.	OK	OK
D.1.3. Is the summary of the comments received as provided in the PDD complete?	VVM para 129 (b)	DR	Summary of comments received is included in the section E.2 of the PDD. There was an error in the table of comments.	CL18	OK
D.1.4. Have the project participants taken due account of any comments received and described this process in the PDD?	VVM para 129 (c)	SV/I	There were no negative comments received.	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
E. Environmental impacts					
E.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	VVM para 131	DR	Under the Environmental Quality (Environmental Impact Assessment)(Prescribed Activities) Order 1987, the project activity is not listed as projects that require an Environmental Impact Assessment.	OK	OK
E.1.2. Does the project comply with environmental legislation in the host country?	VVM para 132	SV/I	The project complies with the environmental legislation in the host country.	OK	OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p><u>CAR1</u> An Annex 1 party has yet to be identified. This is against one of the CDM criteria set by the DNA of the host country Malaysia, which requires the participation of an Annex 1 country in CDM projects.</p>	Table 1	Annex 1 party has been identified. Please refer to Section A.3 of Project Design Document (PDD) and Emission Reductions Purchase Agreement (ERPA) between Green Lagoon Technology Sdn Bhd and Camco South East Asia Ltd.	<p>The Annex 1 party is noted as United Kingdom of Great Britain and Northern Ireland. LoA has been obtained.</p> <p><u>Conclusion: CAR1 closed</u></p>
<p><u>CAR2</u> The 'Letter of Acceptance' (LoA) from host country has yet to be obtained.</p>	Table 1	The LoA from host country is being applied	<p>The LoA from Malaysia has been obtained.</p> <p><u>Conclusion: CAR2 closed</u></p>
<p><u>CL1</u> PP to submit supporting documents for the following equipment:</p> <ul style="list-style-type: none"> i. Ponds cover system - Green Lagoon, Malaysia. ii. Biogas engines - Shendong, China. iii. Biogas burner iv. Enclosed flare 	A.2.2	<p>Supporting documents has been provided under the footnotes number of the PDD as below:</p> <ul style="list-style-type: none"> i. Ponds cover system - Green Lagoon, Malaysia. (footnote 19); ii. Biogas engines - Shendong, China. (footnote 9); iii. Biogas burner (footnote 10); and iv. Enclosed flare (footnote 11). 	<p>It was noted during the on-site audit the implementation of the project activity was at a very advanced stage, where the first two anaerobic ponds (Anaerobic 1 and Anaerobic 2) were already covered and the two biogas engines were already installed and being commissioned.</p> <p>The pond cover system is an in-house technology whereas the biogas burner to be installed at the existing biomass boiler is sourced from a local supplier.</p> <p>The imported components are the biogas engines and the enclosed flare. They are brought in from China and Switzerland respectively.</p> <p>Based on observations at site together with the supporting documents provided, it can be concluded that the project activity reflects good engineering practices.</p> <p><u>Conclusion: CL1 Closed</u></p>
<p><u>CL2</u> PP to submit supporting document(s) or</p>	B.1.2.	Supporting document to reflect the depth of the ponds is attached.	With regards to the depth of the ponds at the project activity site, it was confirmed

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
reference(s) related to the depth of the ponds and ambient temperature.		Average Minimum and Maximum Temperature in Malaysia for the year 2011 has been attached in the PDD (see footnote no. 13).	<p>from a layout drawing provided that the depth of the ponds are between 3.3m and 4m. This meets the applicability condition which specifies that the depth of the ponds must be greater than two meters. The dimensions of all the ponds in the baseline scenario are specified in Section A.4.1.4. of the PDD. The figures are found to be consistent with the information obtained in the layout drawing.</p> <p>As for the ambient temperature, PP had provided a weblink hosted by BBC of UK. The link displays the average maximum and minimum temperatures of Kuala Lumpur throughout the year. The information was deemed ample as the temperature in Kuala Lumpur can be considered as representative of at least Peninsular Malaysia. The maximum and minimum temperatures were at 32°C and 22°C respectively, meeting the applicability condition that specifies that the ambient temperature must be above 15°C for at least part of the year.</p>
CL3 PP to submit the full agreement between PP and PPOM.	B.5.6.4	The full agreement between PP and PPOM is attached	<p>Conclusion: CL2 Closed</p> <p>Based on the contract and related supporting documents provided, it was confirmed that the capital expenditure to be borne by PP only covers that of the covered ponds digester system and the associated installations and CDM-related monitoring instrumentations.</p> <p>Also, as per contract, all costs associated with the utilisation of the biogas are borne</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>by PPOM. This is correctly reflected in the PDD and the financial analysis, where the costs of the biogas burner and the biogas engines are not reported as CAPEX. The contract further specifies that PPOM will have the first claim for the usage of the biogas generated from the project activity to be utilised at the biogas equipment. As far as revenue is concerned, the contract clearly states that the revenue stream for PP would be from the CERs generated through the project activity. No other forms of revenues are available in the contract. This is in-line with the project activity description and the financial analysis provided.</p> <p>Conclusion: CL3 Closed</p>
<p>CL4</p> <p>With regards to the financial calculations provided, PP to clarify/provide supporting evidence(s) for the followings:</p> <ul style="list-style-type: none"> i. The FFB values applied in the financial calculations, as they differed from the values used in the ER calculations. ii. The CERs production rate iii. CERs commitment rate / Transaction cost. iv. The operating expenses (OPEX). 	B.5.6.4	<p>i. The FFB values applied in the Financial Calculation Sheet has been revised as per CERs Calculation Sheet. The average figures were used to indicated average FFB for the last 5-years for conservativeness, such that the higher than average or lower than average value is not utilised, for conservative estimated of emission reduction</p> <p>Justification for FFB values used are attached.</p> <p>ii. The CERs production rate in the Financial Calculation Sheet has been revised as per CERs Calculation Sheet;</p> <p>iii. The CERs commitment rate has been</p>	<p>Comments on Response 1:</p> <p>i. The Excel sheets were checked and it is found that the FFB values have been revised. The FFB values used in the ER calculation and in the financial analysis are now the same. The figures are based on the projection by the mill. Issue closed.</p> <p>Comments on Response 1:</p> <p>i. The supporting document which is 'Schedule 1' of the ERPA between GLT and Camco, clearly specifies the selling/commitment rate to be at 86% of the market price. Issue closed.</p> <p>Comments on Response 1:</p> <p>ii. The supporting document provided</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>revised to 86% of CERs market price. The supporting evidence for CERs commitment rate/ Transaction cost can be referred to ERPA between Green Lagoon Technology Sdn Bhd and Camco South East Asia Ltd; and</p> <p>iv. The operating expense (OPEX) has been revised to 11.5% of the project investment cost (CAPEX). The OPEX value is based on the lowest among seven registered CDM project in West Malaysia using same type of methodology and technology.</p>	<p>contains links to seven projects. However, the links are not accessible hence the sources of Excel sheet information given cannot be confirmed.</p> <p>In order to support the OPEX figure, PP used seven registered CDM projects as the reference. The projects and their respective OPEX to CAPEX ratios are: ENDAU – 11.50% FOONG LEE – 11.86% FELDA JENGKA 3 – 15.45% KOSFARM – 13.11% SETIAKAWAN – 19.78% PPNJ KAHANG – 17.00% ROMPIN – 13.18%</p> <p>Due to the significant variation, PP to justify the use of <u>AVERAGE</u> figure is the most conservative option.</p> <p>Comments on Response 2: iv. The revised links were found to workable and appropriate. The projects referred to, are confirmed to be as registered projects as enlisted above.</p> <p>With regards to the ratio between OPEX and CAPEX, PP had decided to use the minimum from the referred projects, i.e. 11.5%. This is deemed to be conservative, thus accepted. The figure was also correctly applied in the revised FA Excel sheet. Issue closed.</p> <p><u>Conclusion: CL4 Closed</u></p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL5 As for the project lifetime, PP is requested to provide supporting document(s) for major equipment i.e. the ponds cover system to validate lifetime of the project activity.	B.1.2	The project lifetime of the major equipment (i.e. pond cover material) is attached	Comments on Response 1: The project lifetime refers to the technical lifetime of the project activity, not the crediting period. Therefore, PP is requested to provide supporting evidences that can confirm the technical lifetime of the major equipment which in this case is the pond cover system. Comments on Response 2: Based on the manufacturer, GSE, the polyethylene geomembrane, i.e. the pond cover, can last in excess of 10 years. This evidence is deemed adequate to reflect the technical lifetime of the project activity. Conclusion: CL5 Closed
CL6 PP to rectify the calibration procedures to be in line with the 'General Guidelines to SSC CDM methodologies' for parameters POME flowmeter and biogas flowmeters.	C.1.5	As per "General Guidelines to SSC CDM methodologies", the QA/QC procedures for the calibration interval of the POME and biogas flowmeters will be based on manufacturer specifications, but at least once in three years".	The revised QA/QC procedures have included the clause to ensure that calibration of the flowmeters will be carried out at least once in three years. This is found to be in accordance to the "General Guidelines to SSC CDM methodologies". The revision has also been included in the PDD. Issue closed. Conclusion: CL6 Closed
CL7 There was only a single point of methane concentration measurement indicated in the monitoring plan. This was deemed inadequate to satisfy the methodological requirement that specified that " <i>the methane concentration measurements shall be taken close to a location in the system where a biogas flow measurement</i>	C.1.4	Three measurement points have been revised to satisfy the methodological requirement that specified that " <i>the methane concentration measurements shall be taken close to a location in the system where a biogas flow measurement takes place</i> ". The methane concentration measurements in	The revised PDD indicated methane concentration measurements will be carried out at three points, i.e. the biogas streams going to the flare, the biogas engines and the biomass boiler. This set-up is deemed adequate and in accordance to the methodological requirement. Issue closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<i>takes place</i> ” since there are 3 points to measure the flow, i.e. biogas flows to the biogas engines, the biomass boiler and the enclosed flare.		the monitoring plan have been revised to: i. $w_{CH_4,y,flare}$ – Concentration of methane in the biogas entering the flare in the year y ii. $w_{CH_4,y,engine}$ – Concentration of methane in the biogas entering the gas engine in the year y iii. $w_{CH_4,y,boiler}$ – Concentration of methane in the biogas entering the biomass boiler in the year y	<u>Conclusion: CL7 Closed</u>
<u>CL8</u> PP needs to clarify the need to monitor <ul style="list-style-type: none"> • Other flare operation parameter • Electricity consumption, and • End use of final sludge 	C.1.2	Inappropriate parameters have been omitted from the PDD. PDD has been revised to include project activity electricity consumption. Please refer to $EC_{PJ,i,y}$ under the Section B.7.1 of the PDD. Monitoring parameter of “End use of final sludge” has been inserted in the Section B.7.1 of PDD.	The exclusion of the ‘other flare operation parameter’ is noted. This parameter is no longer listed as a parameter to be monitored in the revised PDD. The provision to monitor power consumption ($EC_{PJ,j,y}$) by the project activity is included in the revised PDD. The provision to monitor the end use of final sludge (End use of final sludge) during the project activity is included in the revised PDD. The description provided on the monitoring method and the QA/QC is deemed appropriate and in accordance to the methodological requirement. No issue. <u>Conclusion: CL8 Closed</u>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL9</p> <p>It was found that during non-processing hours or under abnormal circumstances, the mill boiler will not be operated. Thus, the supply of power will come from the back-up gensets.</p> <p>It was noted that PP had excluded CO₂ as a possible source of emission but the justification provided was not wholly accurate as it was indicated that only renewable sources are used for power generation.</p>	B.2.2	<p>In order to take into consideration the use of diesel at the back-up diesel generator during the biomass boiler are not in operation, the project emissions from electricity consumption are accounted for.</p> <p>Table 5: GHG Emissions Considered in the Proposed CDM Project Activity has been revised to include CO₂ emission under the onsite electricity consumption of project emissions.</p>	<p>The revised PDD had included CO₂ as a possible source of emission. This is deemed conservative as the back-up diesel gen-sets, are being used on a regular basis during start-up and non-operating hours of the biomass boilers.</p> <p>The description in Table 5 of the PDD is deemed appropriate.</p> <p><u>Conclusion: CL9 Closed</u></p>
<p>CL10</p> <p>It was noted that PP had listed out all the equipment that will be used in the project activity on top of equipment used in the baseline. This was deemed appropriate. However, the justification to use EF=0 for the use of electricity from the mill was incomplete as it did not take into account the use diesel at the back-up genset when the mill's boilers are not in operation. In addition, it was noted that the use of TDL as an indicator in the formula was deemed inappropriate as it is not applicable. Also, it was found that the conversion factor from kWh to MWh was incorrect. PP to revise the figures accordingly.</p>	B.4.1	<p>In order to take into consideration the use of diesel at the back-up diesel generator during the biomass boiler are not in operation, the project emissions from electricity consumption, PE_{power,y} are accounted for.</p> <p>The determination of PE_{power,y} has been revised in Equation 5 of Estimating Project Emissions under Section B.6 of PDD.</p> <p>The conversion factor from kWh to MWh has been revised from 1000000 to 1000 in the Excel sheet.</p>	<p>Based on the revised PDD, it s noted that PP had decided to take into account the project emission from the use of electricity consumption in ex-ante scenario.</p> <p>The calculations were based on the rated power of all the electrical loads that will be used in the project activity, running 24 hours daily for the whole year. It was found that the calculations were in accordance to the selected tool, 'Tool to calculate baseline, project and/or leakage emissions from electricity consumption, Version 1 – Scenario B: Electricity consumption from an off-grid captive power plant, Option B2: Using 1.3tCO₂/MWh as default value'. The calculations were found to be correct.</p> <p>With regards to the conversion factor, the revised CER Excel sheet was checked and it was found that the conversion factor was correctly changed. Issue closed.</p> <p><u>Conclusion: CL10 Closed</u></p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL11 PP to correct the $B_{o,ww}$ and MCF values for $PE_{ww,treatment,y}$, $PE_{ww,discharge,y}$ and $PE_{fugitive,y}$ used in the ER calculations.</p>	B.4.1	<p>$PE_{ww,treatment,y}$ The MCF value has been revised from 0.1 to 0.8 correspond to ponds depth of Anaerobic ponds 3 to 5 and Facultative ponds 1 and 2 are exceeding 2 meters. The $B_{o,ww} = 0.21$ has been revised to $B_{o,ww} = 0.25$ in the CERs Calculation Sheet. $PE_{ww,discharge,y}$ As the final discharge in the project activity is land application, such type of discharge pathway system to which this project will be applied from Table III.H.1 is <i>aerobic treatment, well managed</i>. Therefore, the MCF for $PE_{ww,discharge,y}$ has been revised from 0.1 to 0.0. $PE_{fugitive,y}$ Differences in MCF value have been revised to 0.8, as the current type of wastewater treatment system to which this project will be applied from Table III.H.1 is <i>Anaerobic deep lagoon (depth more than 2 metres)</i>.</p>	<p>It was confirmed from the CER Excel sheet that the MCF and $B_{o,ww}$ values have been corrected.</p> <p>Conclusion: CL11 Closed</p>
<p>CL12 The formula used follows the baseline emission calculation for wastewater treatment. This is deemed appropriate but with several minor errors. Firstly, as noted in the PDD, the equation is quoted as “Equation 3”, which is not the correct equation number. Also, the use of $\eta_{COD,BL,i}$ as the annotation in the project is inappropriate as the letter BL refers to the baseline scenario. Additionally, in determining the efficiency of the digester system, the final discharge COD obtained from the measurement campaign was used. This does not reflect the COD reduction in the digester system in project scenario. Finally,</p>	B.4.1	<p>The equation number has been revised to “equation 2 of the methodology AMS.III.H, Version 16” and “baseline emission calculation for wastewater treatment (i.e. equation 2)”.</p> <p>Annotation has been revised from $\eta_{COD,BL,i}$ to $\eta_{COD,PJ,k}$ for $PE_{flaring,y}$ calculation.</p> <p>In determining efficiency of the digester system, the final discharge COD has been replaced with outflow COD (COD leaving system) to reflect the COD reduction in the</p>	<p>Comments on Response 1: The annotation $\eta_{COD,BL,i}$ was correctly revised to $\eta_{COD,PJ,k}$ for $PE_{flaring,y}$, both in the revised PDD and the revised CER Excel sheet. Issue closed.</p> <p>It was confirmed from the CER Excel sheet that the efficiency of the digester system had been revised. PP had elected to use the sampling campaign data to represent the efficiency of the digester system. This is deemed appropriate as PP had described in Section A.4.2 of the PDD that the said system would result in an at least 85%</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
the use of $UF_{BL}=0.89$ is deemed incorrect for project. PP to revise description and figures accordingly.		<p>digester system in project scenario.</p> <p>The UF_{BL} of 0.89 has been revised to UF_{PJ} of 1.12 for $PE_{flaring,y}$ calculation.</p>	<p>COD removal efficiency. Issue closed.</p> <p>Based on the revised CER Excel sheet, the UF_{BL} value of 0.89 that was originally applied, had been revised to UF_{PJ} of 1.12 for $PE_{flaring,y}$ calculation. Issue closed.</p> <p>Comments on Response 2: The revised PDD had included the correction on the equation number from Equation 3 to Equation 2. This found to be correct and in accordance to the applied methodology.</p> <p>Conclusion: CL12 Closed</p>
<p>CL13</p> <p>The detail description as per calculations provided in the Excel sheet, was deemed inappropriate and unjustified for $BE_{s,treatment,y}$, $BE_{s,final,y}$, $PE_{s,treatment,y}$ and $PE_{s,final,y}$. PP to revise descriptions accordingly.</p>	B.4.1	Parameters $BE_{s,treatment,y}$, $BE_{s,final,y}$, $PE_{s,treatment,y}$ and $PE_{s,final,y}$ have been deleted from the Excel sheet.	<p>The revised Excel sheet no longer contains any description on $BE_{s,treatment,y}$, $BE_{s,final,y}$, $PE_{s,treatment,y}$ and $PE_{s,final,y}$. This is explained in Section B.6.1 in the revised PDD. No issue.</p> <p>Conclusion: CL13 Closed</p>
<p>CL14</p> <p>The description on “Biogas Engine Plant” in ER spreadsheet was found to be too broad and unjustified. PP to provide further details in terms of the equipment to be used in the “Biogas Engine Plant” and their respective rated capacities. Also, PP to provide supporting documents for all equipment to be used in the project activity.</p>	B.4.1	The description on “Biogas Engine Plant” has been revised with further detail information in the Excel sheet and attachment provided. Biogas from the 2 numbers of bio-digesters is drawn by the positive displacement blowers. The biogas will be treated in the scrubber to remove H_2S and dryer to remove moisture before enter into biogas engine. The cooling towers are used to cool down the biogas engine. The total electrical rating of the equipment to be used in the Biogas Engine Plant is 76 kW”; where there are 2 units of equipment listed, one unit is operational and	<p>Comments on Response 1: Based on the supporting document entitled ‘Biogas Engine and Supporting Equipment List’, the description of “Biogas Engine Plant” and its revised total rating of 76 kW can now be substantiated. This is consistent the figure used in the CER Excel sheet.</p> <p>However, the response provided in this protocol indicated that the total rated power for “Biogas Engine Plant” is at 87.05 kW. Additionally, the supporting documents to substantiate the rest of the enlisted</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>the other will be for standby Additional documents to substantiate the rest of the listed electrical loads are attached. The electrical ratings of the equipment to be used in the 'Biogas Engine Plant' have been revised under $PE_{power,y}$ in the Excel sheet.</p>	<p>electrical loads are still unavailable.</p> <p>Comments on Response 2: The correct electrical load for the “Biogas Engine Plant” is confirmed to be 76kW, as per supporting document provided. With regards to the other electrical loads enlisted, PP had provided the relevant supporting documents to substantiate the figures used. The figures used were confirmed to be correct. The final CER Excel sheet was checked and the calculations were found to be correct.</p> <p><u>Conclusion: CL14 Closed</u></p>
<p><u>CL15</u> The desludging records confirmed that had taken place but there was no evidence to support that the sludge is being soil applied.</p>	B.1.2	Evidence for sludge soil application and date of activity is attached	<p>Comments on Response 1: The supporting document is in the form of pictures showing the desludging activities prior to being land applied. However, the date of the said activities cannot be confirmed.</p> <p>Comments on Response 2: PP had appended an application letter dated 01/03/2011, to the nearby estate for the sludge to be land-applied. Issue closed.</p> <p><u>Conclusion: CL15 Closed</u></p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL16</p> <p>The COD sampling points were inspected and found to be appropriate. The laboratory results were checked and data transfer was found to of no error. Nevertheless, there was an anomaly spotted for the sample taken on 05/11/2011, where the outlet of Anaerobic Pond 2 and the final discharge values was abnormally lower and higher respectively. Additionally, it was found that the application of the uncertainty factor of 0.89 was on the COD values not the COD removal efficiency. PP to submit COD campaign results and revise the findings accordingly.</p>	B.4.1	<p>The anomaly result for the sample taken on 05/11/2011 has been omitted in the emission reductions calculation to maintain reliability of the results.</p> <p>The uncertainty factor of 0.89 has been revised to apply on COD removal efficiency.</p>	<p>Originally, PP had carried out a 12-day sampling. Therefore, the decision to omit the 'abnormal' figure obtained for the sample taken on 05/11/2011 is considered appropriate as the 11-day data still fulfil the methodological requirement which specifies that the sampling should be a 10-day exercise. Issue closed.</p> <p>The uncertainty factor from the sampling exercise had been correctly applied on the COD removal efficiency. Issue closed.</p> <p><u>Conclusion: CL16 Closed</u></p>
<p>CL17</p> <p>PP to submit copies of the newspaper announcement, invitation letters, presentation materials and attendance list.</p>	D.1.1	<p>Copies of the newspaper announcement, invitation letters, presentation materials and attendance list have been submitted as attached with the stakeholder report.</p>	<p>Based on the submissions, it can be confirmed that the announcement and invitations were appropriately done. The announcement was made in a well known local English newspaper on 15/11/2011. The invitation to the local Department of Environment was also sent out on the same date.</p> <p>The presentation materials suggest that sufficient information was passed to the stakeholders who attended the meeting. And based on the summary of Q&A, it can be concluded that the concerns raised were adequately addressed and no negative feedbacks were received.</p> <p><u>Conclusion: CL17 Closed</u></p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<u>CL18</u> It was found that the designation of the person who asked the second question in the table of comments was incorrect. PP to revise the table.	D.1.3	The table has been revised to reflect the correct designation of the person who asked the second question in the table of comments (Revised from member of the community to Assistant Mill Manager).	The designation Mr Hassan bin Yusuff, the person in question had been changed to Assistant Mill manager. This is found to be correctly reflected in the revised PDD. <u>Conclusion: CL18 Closed</u>

- o0o -

APPENDIX B
Comments From Global Stakeholders
Consultation Process

APPENDIX B

RESOLUTIONS ON THE COMMENTS RECEIVED FROM GLOBAL STAKEHOLDERS CONSULTATION PROCESS

Comments received	Response from PP	Conclusion from the validation team
<p>On page 6 of the PDD, where does 85% efficiency derive from? Page 16, the options for use of the biogas must be evaluated and financial parameters used to measure options, even if the mill uses the gas, as stated in the Methodology additionality section. Page 19 does not mention a 10 day Measurement Campaign or using the 0.89 conservativeness factor in the calculations, and the efficiency in the data table uses 98.38%, but the data for the COD removal from the anerobic portion of the WWT system shows low 60% removal efficiency. Page 27, statement is made that for incomplete combustion in the flare, the GWP for methane is not considered - why is this?</p> <p>Submitted by: gerald hamaliuk, ghamaliuk@genpower.net</p> <p>On page 6 of the PDD, where does 85% efficiency derive from?</p>	<p>The following documents is attached to support digester efficiency of at least 85%:</p> <ol style="list-style-type: none"> 1. Data from Asia Biogas 2. Report from Waste Solution Ltd, Table 5 3. On-site sampling data of project site 	<p>The three references provided and their respective comments are provided as follows:</p> <ol style="list-style-type: none"> 1. The Asia Biogas system is a 'Covered In-Ground Anaerobic Reactor' (CIGAR) system which in many ways similar to the system, i.e. the system is a refurbishment and optimisation of the existing anaerobic ponds followed by installation of a cover to capture biogas. The technology provider is claiming that the COD removal is in excess of 85%. Although the actual performance might differ, the principle of such technology is deemed similar. 2. This reference is a report based

		<p>on actual biogas capture project at a tapioca starch factory in Thailand. The system in place is also classified as a CIGAR where the COD removal efficiency obtained was more than 90%.</p> <p>3. This is a set of actual data obtained from the project activity. It should be noted that the digester system and the cover were already installed and in operation at the time of visit. Therefore, the use of actual data obtained from the on-going in-house sampling and analysis of the COD inlet and outlet of the digester would be able to provide the best in-sight to the performance of the system in question.</p> <p>Based on the COD analysis done by a third party accredited laboratory, <i>Permulab</i>, between 12/03/2012 and 22/03/2012, the digester efficiency was always more than 95%. This set of analysis results are deemed appropriate to support the claimed efficiency of “at least 85%” indicated in the revised PDD.</p> <p>Issue closed.</p>
Page 16, the options for use of the biogas must be evaluated and financial parameters used to measure options, even if the mill uses the gas, as stated in the Methodology additionality section.	The additionality tool as stated in the methodology has been applied accordingly.	<p>Comments on Response 1:</p> <p>PP had decided to substantiate the additionality based on 3 sets of documents, i.e. <i>‘Combined tool to identify the baseline scenario and demonstrate additionality, Version</i></p>

		<p>03.0.1', 'Attachment A of Appendix B, Version 8' and 'Tool for demonstration and assessment of additionality, Version 05.2.1'.</p> <p>The version of the final tool was found to be inappropriate as <u>it is not the latest tool version</u>.</p> <p>Nevertheless, the additionality analysis was found to be appropriate and satisfactory.</p> <p>Comments on Response 2:</p> <p>Since the project is classified as a small scale project, PP had decided to revise the approach on the additionality discussion.</p> <p>Based on Attachment A of Appendix B, EB 63, Annex 24, Version 08, PP is allowed to choose from one the enlisted barriers to justify the additionality of the project activity and PP appropriately selected "Investment Barrier" as the point of discussion.</p> <p>Further, PP had applied the "Non-binding best practice examples to demonstrate additionality for SSC activities, EB 35, Annex 34 to prove that without the project activity the baseline scenario i.e. the open lagoon system without biogas recovery would have continued to be operated. This would have certainly led to higher emissions. It is also noted that there would be no other form of revenue for the project activity except for sales of CER.</p>
--	--	---

		<p>The tools applied were of the latest versions and conclusively the discussion provided was deemed appropriate.</p> <p>Issue closed.</p>
<p>Page 19 does not mention a 10 day Measurement Campaign or using the 0.89 conservativeness factor in the calculations, and the efficiency in the data table uses 98.38%, but the data for the COD removal from the anaerobic portion of the WWT system shows low 60% removal efficiency.</p>	<p>10-day measurement campaign (11 day measurement campaign was conducted) and the use of uncertainty factor for emissions calculation have been mentioned in the parameter tables of $COD_{ww,untreated,y}$, $COD_{ww,treated,y}$, $COD_{ww,discharge,BL,y}$ and $COD_{ww,discharge,PJ,y}$ under Section B.6 and Section B.7.1.</p> <p>The value of 98.38% and 60% was tabulated incorrectly where the COD inflow and COD outflow value was multiplied with 0.89 (for baseline emission) and 1.12 (for project emission), instead of the efficiency of the system being multiplied with the uncertainty range of 0.89 for both baseline and project emission.</p>	<p>Comments on Response 1:</p> <p>It was confirmed from the CER Excel sheet and the actual laboratory results that an '11 day Measurement Campaign' was conducted. The use of the '0.89 uncertainty factor' was also checked and found to be correctly applied in the calculations. However, the explanation with regards the 1.12 figure is deemed irrelevant. Also, Section B.7.1 of the PDD list out all the monitoring parameters ex-post. This is also deemed irrelevant to the 10-day sampling campaign. PP to revise the response accordingly.</p> <p>Comments on Response 2:</p> <p>The efficiency figures for the baseline and projects activity were revised taking into consideration the uncertainty factors. The final figures were checked and were found to be reflective of the scenarios and appropriate.</p> <p>Issue closed.</p>

	<p>Page 27, statement is made that for incomplete combustion in the flare, the GWP for methane is not considered – why is this?</p>	<p>The exclusion of GWP_{CH4} in the PE_{flaring,y} estimation is as according to methodology AMS.III.H, Version 16:</p> <p><i>“for ex ante estimation, baseline emission calculation for wastewater treatment (i.e. equation 3) can be used to calculate the methane emission due to incomplete flaring, but without the consideration of GWP for CH₄”.</i></p>	<p>The explanation is deemed appropriate as the methodological clause quoted clearly state that GWP_{CH4} is to be disregarded in the estimation of PE_{flaring,y}.</p> <p>No issue.</p>
--	---	--	---

APPENDIX C
AUDITOR'S CERTIFICATE

Sijil Certificate

This is to certify that

SYED ANUAR SHAH BIN SYED MANSOR

has been qualified as

**LEAD AUDITOR
FOR
CDM VALIDATION AND VERIFICATION SCHEME**

in accordance with the relevant provisions of SIRIM QAS International's CDM procedure

Sectoral Scopes No. : 1 – Energy industries (renewable/non-renewable sources)

TA 1.1 – Thermal energy generation from fossil fuel and biomass including thermal electricity from solar (COMPLEX)

TA 1.2 – Energy generation from renewable energy sources.

Sectoral Scopes No. : 13 – Waste handling and disposal

TA 13.1 – Waste handling and disposal.



Parama Iswara Subramaniam

Chairman

Auditor Evaluation Panel

Management System Certification Department

SIRIM QAS International Sdn. Bhd.

Qualification Date : **23 November 2011**

Sijil Certificate

This is to certify that

AERNIDA ABDUL KADIR

has been qualified as

**LEAD AUDITOR
FOR
CDM VALIDATION AND VERIFICATION SCHEME**

in accordance with the relevant provisions of SIRIM QAS International's CDM procedure

Sectoral Scope No: 1 – Energy industries (renewable/non-renewable sources)

TA 1.1 – Thermal energy generation from fossil fuel and biomass including
thermal electricity from solar (COMPLEX)

TA 1.2 – Energy generation from renewable energy sources.

Sectoral Scopes No: 13 – Waste handling and disposal

TA 13.1 Waste handling and disposal.



Parama Iswara Subramaniam

Chairman

Auditor Evaluation Panel

Management System Certification Department

SIRIM QAS International Sdn. Bhd.

Initial Qualification Date : **13 April 2011**